

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. XIV.—NEW SERIES.

**MEMOIR ON THE PHYSICAL CHARACTER
OF THE
NERBUDDA RIVER AND VALLEY;**

WITH REMARKS ON THE PRACTICABILITY OF THE RIVER BEING RINDLED
A NAVIGABLE STRIAM

**ALSO A DESCRIPTIVE DETAIL OF THE MINERAL RESOURCES OF THE NERBUDDA VALLEY, AND
AN ANALYSIS OF THE PAST CORRESPONDENCE OF GOVERNMENT,**

ON THE SUBJECT OF THE

COAL BEDS IN ITS VICINITY,

BY SURGEON E. IMPEY,

BOMBAY MEDICAL ESTABLISHMENT

TO WHICH ARE APPENDED,

**A SELECTION FROM THE RECORDS OF THE BOMBAY GOVERNMENT,
1838 1851,**

RELATING TO THE NERBUDDA RIVER

AND THE

MINERAL DISTRICTS OF THE VALLEY;

AND

EXTRACTS FROM REPORTS

BY

MR J J BERKLEY,

CHIEF RESIDENT ENGINEER, BOMBAY, OF THE GREAT INDIAN PENINSULA RAILWAY COMPANY

AND

LIEUTENANT COLONEL J. P. KENNEDY,

MANAGING DIRECTOR AND ENGINEER-IN-CHIEF OF THE BOMBAY, RAJOD, AND CENTRAL INDIA RAILWAY COMPANY

With Accompaniments to the latter Report.

EDITED BY R. HUGHES THOMAS, ASSISTANT SECRETARY, POLITICAL DEPARTMENT.

B o m b a y :

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1855.

CONTENTS.

	PAGE
Introductory remarks	3
Observations on the difficulties to be encountered in endeavouring to make the Nerbudda a navigable river	4
Description of the course and general character of the Nerbudda	ib.
Description of the ranges of hills on both banks	ib.
Affluents supplying the river	5
Course of the river	ib.
Depth of water	ib.
Declivity of the river	ib.
Current of the river	6
Falls, or descents of the river	ib.
Bed of the river	ib.
Peculiarity of geological and physical formation of the bed of the river	ib.
Numerous fords	7
Character of the bed of the river	ib.
Rapids	ib.
Nerbudda boats	ib.
Basins of the Nerbudda	ib.
Description of the banks of the basins	8
The true Valley of the Nerbudda	ib.
Mineral deposits of the marine lakes or basins	ib.
Tribes of the hilly districts	ib.
Objects of river navigation	ib.
Difficulties of the Nerbudda	9
Character of rivers in the immediate neighbourhood of mountains	ib.
Notice of the reaches, and sheets of water, in various parts of the river	ib.
Capabilities of the Nerbudda for purposes of irrigation	10
Parts of the river navigable	10, 12
Lieutenant Keatinge's route down a part of the river	10
Captain Fenwick's route	ib.
Captain Evans's route	ib.
Voyages of Captains Fenwick and Evans compared	
Mineral resources of the Nerbudda Valley	15
Introductory remarks	ib.
The principal mineral products found in the upper basin	ib.

Richness and value of the district...	15
Productions of the basin	ib.
Coal-fields enumerated ...	16
Altitude of the Nerbudda field ...	ib.
Cherapoonjee coal ...	ib.
Situations in the upper basin of the Nerbudda in which coal is found ...	ib.
Thickness of the seams ...	ib.
Pyritous coal-field of Betháree Ghat ..	17
Mine at the Towah field ...	ib.
Quality of the Nerbudda coal ...	ib.
Its resemblance to the Cannel coal of the British mines ...	ib.
Analysis of Nerbudda coal ..	18
Practical comparison with Glasgow coal on board the <i>Lutha</i> steamer ...	ib.
Practical trials of the Sonádeh coal ...	19
Observations relative to the means of transport of the coal from the Nerbudda...	ib.
Expectation alone to be directed to the railroad as the means of transit ...	20
Present average monthly consumption of coal in Bombay ...	ib.
Estimated expense of bringing down Nerbudda coal by rail ...	ib.
Estimated expense of river carriage ...	21
Comparison of expenses between the conveyance of English and Nerbudda coal to Bombay ...	ib.
Advantages to be gained by working the minerals of the Nerbudda Valley ...	ib.
Mr. Jacob's statistics with reference to the Nerbudda iron ..	22
Chemical analysis of iron ore, as found in different situations ...	ib.
The great advantages of working the Nerbudda non ore noticed ..	23
Value of railway communication between the Nerbudda Valley and the ports of Bombay and Kutch noticed ...	24
Great increase of traffic by the opening of trunk roads in various parts of India noticed	ib.
On the subject of the coal-beds in the vicinity of the Nerbudda, and the question of the adaptation of the coal for steam purposes ...	25
Summary of Government records relative to the expense of bringing down coal from the Nerbudda ...	27
The subject resumed in 1817 by Sir G. Clerk ...	28
Statement showing the result of Captain Lynch's experiments of the Nerbudda with English coal ...	ib.
Interest taken in the matter by the Resident at Indore ...	29
Mr. Johnstone's experiments, and Sir R. Hamilton's calculation of the expense of transporting the coal ...	ib.
Mr Johnstone's experiments approved by Government, who place Rs. 10,000 at Sir R. Hamilton's disposal ...	30
The Resident's estimate of monthly expense ...	ib.

CONTENTS.

PAGE

Notice of Captain Fenwick's voyage down 110 miles of the Nerbudda, with a quantity of coal	30
Difficulties encountered during the voyage	31
Description of Sonádeh coal, found on the left bank of the Bohra nudee ...	ib.
Captain Fenwick's land journey with 226 bullocks, conveying 462 maunds of coal from Sonádeh to Dharee	32
Description of Captain Fenwick's voyage from Chikulda in eight boats ...	ib.
Great difficulties met with	33
Sir R. Hamilton's Report on the difficulty of the undertaking	34
Notice of Mr. Jacob's Report on the Mineral Resources of the Nerbudda Valley, and Mr. Berkley's and Colonel Kennedy's Reports on the Rail... ..	ib.
Enumeration of the advantages to be derived to the country by opening a railroad to the valley	37
Correspondence regarding the mineral resources of the Nerbudda Valley... ..	41 to 48
Report by Committee appointed to test in the Steam Factory, Bombay Dockyard, specimens of the Nerbudda coal... ..	49
Instructions issued by the Resident at Indore, for the guidance of Mr. Johnstone, and other Officers examining the coal-fields in the Nerbudda Valley... ..	51 to 54
Letter from the Resident at Indore to Government, relative to his visit to the coal-fields of the Nerbudda	55 to 57
Letter from the Resident, submitting copy of one from Mr. Johnstone, replying to queries regarding the coal at Sonádeh	58
Quality of the coal	ib.
Thickness of the seam... ..	ib.
* The best mode for working	59
Transmission of the coal to Bombay... ..	ib
Expense of digging and carrying away the coal	ib.
Extent of the coal basin	ib.
Further correspondence submitted by Mr. Hamilton	60 to 67
Reply from Government	67
Further correspondence between Mr. Hamilton and the Government .	69 to 71
Despatch from the Government to the Honorable Court of Directors, regarding the Nerbudda Valley as a coal district	72 to 74
Further correspondence submitted by Mr. Hamilton	74
Captain Fenwick's Journal from the 5th to the 23rd April 1848, kept during a voyage from Dharee to Hurun Pall, in charge of boats laden with Nerbudda coal	77 to 86
Further correspondence on the subject of the conveyance of Nerbudda coal to Bombay	86 to 92
Captain Fenwick's Journal from the 29th July to the 9th August 1848, kept during his voyage from Chikulda to Broach	92
Captain Fenwick's Journal	93. to 101
Further correspondence	101
Reply from the Honorable Court	103
Letter from Mr. Hamilton, regarding the cost of conveying coal from the Nerbudda to Bombay	105 •

	PAGE
Statement exhibiting the rates of the several tenders for the supply of coal to the Indian Navy received between August 1844 and December 1847...	106
Letter from the Superintendent of the Indian Navy, submitting the result of a trial of the Nerbudda coal made on board the steamer <i>Medusa</i> ...	ib.
Report by Lieutenant Grounds on ditto ...	108
Correspondence between Mr. Hamilton and the Government of India regarding the sinking of a shaft in the coal-field at Sonádeh ...	111
Further correspondence between the Resident and the Bombay Government ...	113
Correspondence between the Bombay Government and the Government of India ...	114, 115
Extracts from a Report relating to the Nerbudda River and Valley, by Mr. J. J. Berkley	
Observations relative to the route taken	ib.
The line comprised in Section No. 3	ib.
Ditto ditto No. 4	120
Ditto ditto No. 5	121
Ditto ditto No. 6	122
Ditto ditto No. 7... .. .	123
Observations regarding the course of the Nerbudda ...	ib.
Observations regarding the presumed traffic on the line	ib.
Observations regarding the minerals to be found on the line ...	ib.
The traffic on the Agra and Bombay road, taken at Akharpoor, for twelve months, from April 1853	126
Observations relative to the returns, estimates, and cost... .. .	127
Extracts from a Report by Lieutenant Colonel Kennedy, Managing Director of the Bombay, Baroda, and Central India Railway Company	131 to 133
Estimate by Lieutenant Colonel Kennedy of the proximate cost in constructing an average rule of single track railway, by each of three methods ...	134
Report on the Iron and Coal Districts of the Nerbudda Valley, from Ponassa to Jubbulpore, by Mr. Jacob, Assistant Engineer, and Geologist to the Bombay, Baroda, and Central India Railway Company	136 to 141
Report in reference to the Line required to open up the Mineral Districts of the Nerbudda Valley, by Mr. Jacob	141 to 144
Report on the Nerbudda River by Mr. J. T. Green, First Assistant Engineer to the Bombay, Baroda, and Central India Railway Company	144, 145

ALPHABETICAL INDEX.

A		PAGE
Affluents .. ..	..	5
Agra .. ..	..	126
Akbarpoor .. ..	..	ib.
Altitude of coal-field .. ..	..	16
Analysis of the coal .. ..	..	18

B		PAGE
Banks of basins .. ..	..	8
Basins .. ..	..	7, 59
Bed, geological formation .. ..	..	6
Bed of the Nerbudda river .. ..	..	ib.
Berkley, Mr.	21, 31, 119	
Betháree Ghat coal .. ..	..	17
Boats .. ..	..	7
Bohra nudee .. ..	..	31
Bombay .. ..	..	24

C		PAGE
Cannel coal .. ..	..	17
Cherapoonjee coal .. ..	..	16
Chikulda .. ..	..	33
Clerk, Sir G. .. ..	..	28
Coal basin .. ..	..	59
Coal-bed .. ..	..	25
Coal-fields .. ..	..	16
Coal, transmission of .. ..	..	59
Committee, Report of .. ..	..	49
Consumption .. ..	..	20
Correspondence	60, 101, 108, 113	
Costs .. ..	..	127
Course of the Nerbudda river	4, 5, 123	
Court of Directors .. ..	..	72, 103
Current .. ..	..	6

D		PAGE
Declivity of the Nerbudda river ..	..	5
Difficulties of ditto .. ..	..	9

E		PAGE
Estimates, .. ..	..	127
Evans, Captain .. ..	..	11
Expense by rail .. ..	..	20

F		PAGE
Falls .. ..	..	6
Fenwick, Captain	11, 30, 32	
Fenwick's, Captain, Journals, ..	..	77, 93
Fords .. ..	..	7

G		PAGE
Glasgow coal .. ..	..	18
Green, Mr. .. ..	..	114
Grounds, Lieutenant, I. N. ..	..	108

H		PAGE
Hamilton, Sir R.	29, 30, 34, 51	
Hills, ranges of .. ..	..	4

I		PAGE
India, Government of	32, 114	
Indore, Resident at .. ..	..	29
Indus steamer, trials of Nerbudda coal on board of the .. ..	..	18, 42
Iron, native .. ..	..	21
Iron ore, chemical analysis of ..	..	22
Irrigation, .. ..	..	10

J

	PAGE
Jacob, Mr.	22, 34, 136, 141
Johnstone, Mr.	29, 30, 51
Journals, Captain Fenwick's	77, 93

K

Keatinge, Lieutenant	10
Kennedy, Lieut. Col.	21, 31, 131, 134
Kutch	21

L

Lynch, Captain, I. N.	28
-------------------------------	----

M

<i>Medusa</i> steamer, trial of Nerbudda coal on board of the	106
Mineral deposits	8.
Mineral resources	15, 11, 123

N

Navigation	8
----------------------	---

Q

Quality of coal	17, 58
---------------------------	--------

R

	PAGE
Railroad	20
Rapids	7
Reaches	9
Resources, mineral	15, 41
Returns	127
River carriage	21
Roads, trunk	24
Route	119

S

Seams, thickness of	16, 58
Sections, Nos. 3 to 7	119 to 123
Sonádah coal	19, 31, 58
Statement by Captain Lynch	28
Statement of tenders	106
Statistics	22

T

Thickness of coal	58
Towah field	17
Traffic	123
Transmission	59
Transport	19
Tribes	8

W

Working, best mode of	59
---------------------------------	----

MEMOIR
ON THE
PHYSICAL CHARACTER
OF THE
NERBUDDA RIVER AND VALLEY;

WITH REMARKS ON THE PRACTICABILITY, OR OTHERWISE, OF
THIS RIVER BEING RENDERED A NAVIGABLE STREAM.

NERBUDDA RIVER AND VALLEY.

Among the varied and important subjects that are presented for the consideration of Government, few could be more appropriately selected, or better calculated to interest the public, whether in a commercial or scientific sense, than those which tend to develop or display the resources of unknown or imperfectly explored parts of the Indian Empire, such as the accompanying papers refer to.

There are few, perhaps, to which the utility of publicity is more happily applicable, or in which substantial advantages are more likely to revert to the governing body, than the promulgation of records which afford either public officers, or more directly interested persons, the means of acquiring information thereon.

It seldom happens that official proceedings, which are for the most part conducted with some specific intention, and limited to one object, contain an epitome of previous information connected with any given subject, which often extends over lapses of years and voluminous detached records: it is scarcely reasonable, therefore, to expect that the formal nature of official correspondence is sufficiently interesting to invite lengthened or patient perusal; hence the arrangement and abridgment of a series of papers may have an instructive as well as an attractive tendency.

The *objects* of the present records are, the exposition of the navigation of the Nerbudda, and the mineral resources of a portion of the valley of that river. The period included is from 1838 to 1854.

The *subjects* are, the actual descent of the river with a small cargo of coal; the sinking of a shaft at the Nerbudda coal-fields; the experiments and trial of the coal in Bombay; its proven good quality; and the exposition of the capacity and richness of the district through which the railway is about to run.

That these subjects, so often adverted to, and more than hinted at by officers locally employed, should have remained so long in abeyance, seems at first glance matter of surprise, and has been flung at Government as expressive of laxity and disregard on their part for the material benefit of the country, and of the civil benefits which attend the opening of river navigation everywhere; but it is not to be forgotten that other interests were at stake besides the gratification of a quasi popular demand, and it may be demonstrated that

it was not without reason and information, foresight, and, it may be added, *justice*, that the navigation of the Nerbudda has been left out of the reckoning of the great works which have engaged public attention.

In a country where trunk roads have been, and are deficient, the value of any river navigation, having a shadow of practicability, could never be overlooked, whether in relation to its influence in assisting the efforts of human industry, to the facilities it affords for conveying the produce, and supplying the deficiencies of distant parts, or of exciting the internal trade (in all accessible directions) of neighbouring provinces, whose products admitted of exchange,—the very foundation and essence of all trade. In point of economy also, attention would naturally be directed to any expedient which promised—as water-carriage ought—a saving of one-fourth the cost of roads, especially from districts teeming with the most luxuriant cereals and grains, dyes, woods, and cotton, besides inexhaustible quantities of valuable minerals—as iron and coal—of the very richest quality.

To argue that such afforded no temptation or inducement to a Government never niggardly inclined, and that such would be foregone without an attempt to realize it, either in the way of experiment, or in the more cautious and practical form of inquiry, is to believe our rulers insensible to the sentiments which guide ordinary men in the regulation of their interests.

It may be found, however, that their apparent supineness has been based on good grounds; for the Nerbudda, in its physical characters and features, presents such insurmountable obstacles to ordinary calculations, that it may safely be said to be impracticable as a navigable stream; and its valley, so much lauded, is for several hundred miles, in detached portions, a barren, hilly, and uncultivable jungle. The great agricultural districts referred to lie north of its upper portion, while the chief mineral ones stretch over the south bank of one of its central basins, from 250 to 500 miles from the sea; in which distance its free navigation, far from equalling that of ordinary rivers, which is at the least one-fourth of their length, scarcely extends beyond its limited tideway of twenty-five miles, through the year round.

A description of the course and general character of the Nerbudda may not therefore be uninteresting, and may tend to dispel some of the debatable points which have obscured it, and which a glance at the accompanying map may aid. It will be seen that, from its source to its debouchure, the Nerbudda is closely bounded on both banks by two ranges of high hills, from 200 to 2,000 feet high: these are the Vindhyan and Bander Mountains on the north bank; the Satpooras, Kalyong, and Mahadeo Hills on the south;—the two great ranges which cross Central India, and which have elevated spots, such as Amurkuntak, 5,000 feet; Pachmari, 3,000; Mainpat, 2,700; and Jam Ghat, 2,000 feet high.

In no points continuously are these ranges distant from the river above forty miles, the average being eighteen or twenty; and they run parallel to it through its whole length. In its upper portion, from Mandla, and almost from Amurkuntak,

to Jubbulpore; in the centre from just below Hindca to Burweye; and lower down, from the Hurun Pall to Mokree, the hills close in so narrowly as to form absolutely the banks of the river. The abrupt face of both these ranges is to the south, their declivity and principal water-shed to the north. The great affluents which supply the river are consequently furnished from the northern aspect of the southern range, the northern feeders being comparatively smaller, fewer, and shorter.

The proximity of the hills increases the number of these feeders, adds immensely to their volume and velocity, and accounts equally for the sudden flushing of the river in the rains to seventy and ninety feet, often in a few hours, and also for its shallowness in the fair season; the tributaries being literally the drainage of the mountain ranges, which rapidly empty themselves, owing to their short course and rapid fall: their rugged and precipitous nature, in fact, makes them torrents rather than streams. Of their size, some idea may be gathered from one (the Towah), whose flood area is stated by Mr. Berkley to be 1,276 yards from bank to bank in the rains, while it is all but dry in the fair weather. The Karun also, near Goojree, on the north bank, is nearly as wide, requiring a bridge of five large elliptical arches to span it.

The Nerbudda, then, rising in the highest land of Central India, 5,000 feet above the sea, and pursuing a serpentine westerly course for 750 miles through a hilly tract, which runs parallel to, and borders closely both its banks, may be said to flow through a longitudinal cleft rather than a distinct valley, and to present the general characters of a mountain stream more than anything else. No great depth of water can ever be expected in it, from the nature of its tributaries, except in the monsoon; neither, were they to promise better, could it be retained, owing to the great declivity of the bed of the river, which from Jhansee Ghat, near Jubbulpore, to the sea, falls 1,200 feet in 500 miles. So short a course, with such an extent and approximation of mountain region, precludes, *à priori*, much internal navigation, which implies length, and little elevation. In this respect the Nerbudda resembles similarly circumstanced rivers in mountainous countries, as in the north of Scotland, Sweden, Norway, and the West Coast of America, the rivers of which are useless for purposes of navigation. Unlike even the rivers of India, it has no lower or level portion, except for about sixty to eighty miles from Tullukwara, or Mokree, to the sea, and even in that distance it is interrupted at low-water by several rapids.

Its great declivity from its source to its debouchure would seem of itself to augur extreme rapidity as fatal a point to navigation as want of water, and creative of the latter; for were the descent direct and gradual, it would involve a fall of $6\frac{1}{2}$ feet to the mile. The Godavery (Colonel Cotton states) is 2 inches; the Amazon, 700 miles from the sea, .02; and the Ganges about 1 foot per mile, 800 miles from its source. Since, in the flow of water, a fall of twelve inches per mile is equivalent to a current of one mile per hour, that of the Nerbudda would have an estimated flow of nearly seven miles, sufficient to drain off the monsoon supply many times multiplied.

In the rains, Captain Evans computed the current to be six or seven miles; Captain Fenwick eight or nine miles. In the dry weather, Lieutenant Keatinge found it from three to four; for he performed the journey from Dharee to Oonkar, twenty miles, in five hours; and from the latter to Mundlaisir, thirty miles, in ten hours, by the strength of the current alone, the wind being unfavourable, and against stream. The decline of the river is not, however, a gradual slope, but is intercepted by ledges, and drops off from ten to forty feet, which divide its form and valley into natural basins, in which the stream is slower, the banks high and alluvial, and shoals and fords are found, owing to the débris brought down by the force of the tributaries.

Within the first 250 miles, the extreme elevation of the table-land leads to a very rapid descent of upwards of 3,000 feet, for Jhansee Ghat, 500 miles from the sea, is barely 1,300 feet above its level; Mundlaisir, 210 miles from the coast, is 698 feet; Chikulda, 150 miles, 583 feet; which would indicate a decline of nearly three feet per mile for the bed of the river, and a corresponding increase to the velocity of the current, whose rate is, however, never uniform or steady, in consequence of the number of drops and ledges, deep pools, and rapids, which obstruct it.

The first of the great perpendicular descents occurs somewhere near Mandla, 150 miles from the source of the Nerbudda, and is said to be ninety feet; but very little is known of it. A small one of ten feet is also said to exist opposite Omeria, and the mouth of the Thain river. The second large fall Lieutenant Keatinge describes at Mundhar, twenty-five miles below Hindia, and to be forty feet, preceded by two miles of great incline. A similar fall of forty feet occurs at Dharee, twenty-five miles lower, from which there is a tolerable level for sixty-five miles to Sahesur Dhurah, where a small fall of ten or fifteen feet is met. For seventy miles further there is again a tolerable level, obstructed by numerous shoals and rapids, until the hills close in at the Hurun Pall. From one mile below this to Mokree, where the jungle ceases (a distance of eighty miles), there is a constant succession of less remarkable but still serious obstructions, extending from a few yards to several miles, consisting of rapid inclines, barriers, and the projection of immense rocks, with a rushing stream. The immediate fall over any one of them is not much, but on the whole is 300 feet in the eighty miles; and as they occur, with one exception (Sahesur Dhurah), in the heart of an extensive jungle, and masses of rock form the banks, and protrude in the centre of the bed, they seem to admit of no reasonable removal.

If such grave obstacles present difficulties, the apparently minor ones are scarcely less serious. The bed of the river in its whole length is one sheet of basalt, seldom exceeding 150 yards in absolute width, which has been upheaved in ridges, which cross it diagonally in NE. and SW. directions. These elevations occur every few miles, and cause a kind of natural bund, above which the water is invariably formed into a pond more or less deep, is very shallow over it, and runs rapidly off.

It is this peculiarity of geological and physical formation, creative of so

many natural barriers, which gives rise to the numerous fords which, in all the open and cultivated parts of the Nerbudda Valley, are found occurring every few miles, with a town on each bank; and their very existence indicates the absence of any extent of navigation, which can only be absolutely free between limited intervals.

In such a condition of the bed, the only change produced by time is due to the erosion of the water, whose course being straight, and the force of its accessary feeders so strong, is much obstructed by the deposit of sand and detritus, which the transporting power of the monsoon brings down, and carries to spots where some natural impediment arrests them, or where the rapidity diminishes.

Thus, where the Nerbudda is closed by hills, its breadth less, and the vehemence of the entering streams intense, the rush of water furnishes and lodges the large erratic blocks of *débris*, which the different natural rocky barriers stop, and which contribute to the formation of rapids, and to the decrease of water over them in those places.

But in the larger basins, where the banks are high, and of alluvial and vegetable character, the hills further distant, and the impetuosity of the flood is lost, the larger *débris* are left behind; and the detritus, consisting of light gravel and sand, subsides, and accumulates more, opposite or just below the entrance of the large tributaries. The character, then, of the bed of the Nerbudda, in fair weather (independent of the large falls), may be summed up as consisting of a narrow rocky channel, obstructed by numerous rapids, occurring in the openings of the bare rocky ledges which cross it diagonally. These rapids are tortuous, often at right angles with the general course of the river, and from fifty yards to five miles in length, very shallow, and rendered still more so by the accumulation of sand, rock, and gravel deposited at the mouths of the numerous feeders, which cause a broken eddying current, with from six inches to a foot and a half of water over them, and are not safe (in consequence of projecting rocks) with a rise of twenty feet of water, at which time formidable whirlpools, and a strong unmanageable current, subject to freshes of thirty feet in a few hours, take place.

In the 120 miles between Dharee and the Hurun Pall, there are thirty or forty of these minor obstacles, over which Captain Penwick had either to lighten his boats of their loads, to enable them to float, or to case them down with drag-ropes. The Nerbudda boats being flat-bottomed, and without keels (their established form for ages), but adds additional testimony to the accepted character of the river for shallowness.

The basins of the Nerbudda are those portions of the valley which are so fertile and productive. The upper one, 1,000 feet above the sea, extends from the marble banks of Beira Ghat, opposite Jubbulpore, to a little below Hindea, nearly 200 miles in length, but of little width northerly and southerly, the hills being nowhere above twenty miles distant.

The other great basin, 500 to 750 feet high, stretches from the quartz hills

above Burwe to Chikulda, upwards of 100 miles—it is more open ; the Satpoora range, in some places forty miles distant, to the south ; on the north the Vindhya approach to between fourteen and sixteen miles.

The banks of both basins are forty feet high, the soil alluvial, composed of marl and clay below, the superior stratum being the black vegetable mould. The upper basin is so level, that from Jubbulpore to Hooshungabad, upwards of 120 miles, the fall is little more than fifty feet. In the lower, the fall averages about 200 feet. The centre of the latter is nevertheless nearly 400 feet below that of the upper, Mundlairsir being 700, and Hooshungabad 1,070 feet above the sea ; and Tullukwara, in the inferior or third basin, 100 miles lower down, is 450 feet lower than Mundlairsir.

These successive steps, as it were, are occasioned by the perpendicular falls that intervene, that is from below Hindia to Burwe, and from the Hurun Pall to Mokree, and also above Jubbulpore.

The true Valley of the Nerbudda may therefore be confined to the undulating districts of these basins, which have evidently been marine lakes. In troughs in them, the sandstone and lime have been deposited, and the coal-measures and minerals formed, but principally in the upper. In the lower, sandstone is met only at one place, Baug : from its carbonaceous colouring and admixture,—the lime and associated clay-iron of the coal-measures,—coal will doubtless be found in the neighbourhood ; if so, its height 300 feet above Chikulda, and 850 above the sea, point to identity of formation and qualities.

It is only in these comparatively level parts that anything approaching to free navigation can exist. In the hilly districts, until within the last few years, very few roads or means of intercourse existed, and the country was infested by wild tribes of Gonds and Bheels, who were at deadly feud with the British Government. As late as 1841, Captain Anderson's boatmen refused to proceed twenty-five miles below the Hurun Pall, for fear of Bamun Naique, a Bheel Chief. Again, as to population, that of the fertile tracts of the Saugor and Nerbudda Territories, in the immediate Valley of the Nerbudda, was until recently very scanty : in Nimar it was computed (fifteen years ago) at thirty-five to the square mile ; and any increase sufficient to represent extended capital must be a work of time.

The ulterior objects of any system of river navigation, to be of solid benefit, or to be complete, or permanent, should have reference to such vital points ; and it would scarcely savour of discretion, or judgment, to attempt, with the above data, large undertakings in a river, the inclined plane of whose bed is so great, and the velocity and drain of whose current (though equalized by interruption of natural bunds) is four miles per hour ;—where no assistance can be counted on from winds, which are generally adverse, and blow for the most part against stream ;—in which, in dry weather, scarcely one foot of water can be insured throughout, over its numerous rapids, formed of solid rock, where obstructions of such magnitude as falls of forty feet occur, and hills and forests form the banks for miles ;—where the monsoon freshes rise to seventy and ninety feet, and the proximity

of the hills render their currents impetuous to a degree, and fatal to any closed masonry, except that of the most substantial nature; where the paucity of the population and wealth in the immediate vicinity constitute little to hope from lavish local expenditure, and the territories on the banks do not even pertain to Government, but to Native States interspersed with them; and where, if free navigation were effected at a great cost, it would still be precarious and unsafe, and lead to the questionable result of the diversion of the trade to another seaport, shut up for three months of the year, and to the substitution of it in place of the capital of the Presidency, for the trade of Central India and Guzerat.

The fact of no single river in India being as yet fairly navigable, that depends for its supply of water on the monsoon, and that none in the world in the immediate neighbourhood of mountains are so, is incitive of little inducement to an over-burdened Government to experimentalize by preference at the prodigious cost which locks and canals would impose. Colonel Cotton states that a single weir across the Godavery cost £200,000; and the large and far-famed waterworks in Upper Canada, the Rideau and Erie Canals, which are, properly speaking, rather a succession of raised waters by means of dams, cost from two to six millions sterling. The differences of level are, however, only 445 feet, and the gain a water depth of five feet, opening a communication of 150 miles, which is effected by forty-seven locks, the largest converting only seven miles of rapids (flowing from comparatively still lakes) into navigable water.

In the Nerbudda, on the contrary, the difference of level is at least 1,200 feet, the length 500 miles, and the sudden impetus of the flood likely to be destructive to almost any masonry. An example of the difficulties to be encountered in the latter respect has been before the public of Western India, in the construction of the Jamsetjee Bund over the Motee Moola, near Poona, a stream not one-third of the size of many of the tributaries of the Nerbudda, and no closer to the hills.

The large reaches and beautiful sheets of water scattered over different spots at Jubbulpore, Hooshungabad, and Mhysir, and the slight fall in the basins of the river near them, never fail to excite in every beholder a general feeling and exclamation of pity that partial attempts have not been made to render limited portions of the river improvable; but the great objection is the perpetual recurrence of the expense, as far as refers to the removal of rocks and débris. The decline of the bed is so great, and the material of it so devoid of softness, that any decisive deepening could only be effected by the expensive process of blasting; and when accomplished, and gaps literally cut in the rocky barriers, the effect would be to drain the pools completely, and to establish a greater velocity, which the little elevated ridges now equalize. Artificial bunds and dams would thus be required, in place of the natural ones, to prevent the entire exhaustion of the water of the river.

Viewed in another aspect,—that for irrigation,—the Nerbudda presents scarcely more favourable characters, except that in this case the chief sources of

one evil are counterbalanced by the facilities they admit of otherwise. The banks in the fertile districts being high, and their level trifling, irrigating canals supplied by the river would have to traverse long distances, to obtain sufficient flow in the lateral channels. In lieu of this, the great number of the nullas and small streams, passing in their course through hills and ravines, admit of being bunded at slight cost, and their inclines afford ample and inexpensive slopes for irrigation, and for the formation of tanks and reservoirs. Of this the utmost advantage has been taken for some years in the administration of Nimar, under Sir R. Hamilton, by Major French, Captain Evans, and Lieutenant Keatinge, new tanks having been constructed wherever the population and soil required it, and every old one repaired; and with the usual result—quadrupling the population and revenue in their neighbourhood.

Reverting to what has been actually accomplished on the Nerbudda in the way of navigation, and to the records published. Unfortunately 300 miles of the upper part, indeed as far as Hindea, has not absolutely been traversed, or if so, no report of it is extant. From Ramnuggur, near Amurkuntak, to Mandla, it is reported navigable, but is not made use of, except for local purposes; thence to Jubbulpore is unknown. As the hills approach the banks closely there, it may be surmised to be of the same character as parts similarly circumstanced in its course elsewhere.

From Jubbulpore to Hooshungabad and Hindea, it is believed to be open for boats of light draught, one fall of ten feet only existing, opposite Omeria. Colonel Ouseley endeavoured to have it surveyed, but his party was attacked by the serious remittent fever which the jungles give rise to.

From Hindea (from which Lieutenant Keatinge went down), the river is not applied to navigable purposes, except at the ferries. It is, however, unusually favourable as far as the Ajnal river, twenty-five miles: there it is double its ordinary width, and divided into shallow streams, running between rocks and jungle, with so great an inclination as to give it the appearance of a collection of mountain streamlets, which are concentrated into one large deep pool at the head of the Mundhar falls, which are nearly forty feet in perpendicular height. Thence to Dharee, twenty-five miles, it presents the usual character of pools and shallows, hemmed in between high rocks to one-fourth of its width, with rapids at every mile. It is, in fact, only just passable for fifty miles, which occupied Lieutenant Keatinge nine days. At Dharee the rock is in abrupt, irregular steps of from ten to fifty feet, and a road could not be made, even to the water's edge. The portage distance is 1,490 yards.

From Dharee to Mundlairsir the river presented little difficulty, and was traversed in sixteen hours against wind, both in the months of March and August, on the latter occasion with twelve people in the boat, and a good load of luggage.

Captain Fenwick proceeded over this route in the month of April, on the 11th of which he left Dharee, with fifteen tons of coal, in boats having a draught of two feet and a half. He reached Mundlairsir in seven days, the

difference arising from the laden boats. He met with several rapids and shoals, in four of which his boats were let down, or dragged by ropes.

From Mundlaisir to Chikulda the river has been descended by Captains Anderson and Evans : both officers accomplished the distance, fifty miles, within two days ; it took Captain Fenwick nine.

The general character is the same as from Dharee, namely numerous shallow rapids, with loose stones, and seldom one foot of water over their narrow winding channels. The only great obstacle is the Sahesur Dhurah fall, a belt of rock stretching diagonally over the river, and precipitated over a shelf of eight or ten feet, with a back-water on the south bank. The portage here would be about 1,290 yards. Captain Fenwick's empty boats were eased down with ropes, and the coal carried on coolies' heads. He refers to ten or twelve difficult spots, in three of which drag-ropes were needed ; he however landed and stored his whole cargo at Chikulda.

The distance between Chikulda and the sea has only been performed twice—on both occasions in the monsoon. It is perfectly impracticable in the hot weather, either up or down, and is by far the most dangerous part of the river ; the number and extent of the rapids, whirlpools, and rocks, the velocity of the current, and the amount of jungle, rendering it most perilous and hazardous, and not to be attempted under a rise of twenty feet of water.

Captain Evans accomplished the distance, 160 miles, in 102 hours' sailing, though actually nine days under way. He describes five great obstructions, the Bhorekeyree and Gunoe Ghat rapids, near the Hurun Pall ; the Beytana barrier and belt, twenty miles further, resembling the Sahesur Dhurah ; the Balaghori rapid, near Hamp, four miles in extent ; and the Mokree falls of ten feet, six miles from Soolpan,—which, owing to the height of the river, were shot, and were scarcely perceptible. Captain Evans recommends portage at Sahesur Dhurah, and the Hurun Pall and Mokree. Hence to Tullukwara the river is clear. From the latter to Broach, navigation is not open till September, and boats take five days. In a low condition of the river, there are seven small Ghats in this distance, and the journey extends to fifteen days. Captain Fenwick, with his cargo, took three days longer to perform the journey from Chikulda, the water being considerably lower. He lost one-third of his freight, and several boats, and states his conviction that there is not a mile of free navigation on a stretch between Hurun Pall and Mokree, eighty miles ; and that his cargo was exposed in a manner that would be ruinous to more perishable goods. One boat was lost in the Bhorekeyree rapid, near the Hurun Pall, and two others at the Balaghori rapid, below Hamp, notwithstanding that his arrangements were most cautious and practical. He encountered several difficulties which Captain Evans did not, owing to the water being lower : the Dupána fall, Hailkuree Ghat, Gulchee Ghat whirlpool, Nánka Ghat, Selukda belt, and Peepul Chope rapids, above Soolpan. The nature of these impediments are best learned from Captain Fenwick's Report. They were generally rapids from a hundred yards to four miles in length, and from ten

to fifteen feet incline, studded with rocks in mid-channel, the avoidance of which was prevented by the vehemence of the current.

Sir Robert Hamilton, with whom the impulse and care of this second attempt originated, comes to the conclusion that the river is impracticable for navigation; that from August to December, it might be facilitated by nautical science, and be made use of in this its worst portion, but not from January to June. To test it further, Captain Fenwick returned by water to Chikulda in the monsoon, and reached it with extreme difficulty in forty-three days.

To sum up: it appears demonstrated, that in the fair season, 100 miles of the middle portion of the river only is navigable if cargo is carried, not without having recourse to portage and drag-ropes; and that it is just possible to descend in the monsoon another 100 miles with extreme danger, and possible destruction to life and property. The forcible conclusion is, that the danger, risk, and uncertainty which are inseparable from the navigation of the Ner-budda at present, are all incompatible with that steadiness which should attend a branch of industry and trade which, more than all others, needs a certain and speedy mode of delivery to ensure success, or gain encouragement, and affords little hope to the realization of such projects as Mr. Bourne propounded with his steamers of twelve inches draught, 250 tons of cargo, and a speed of fifteen miles an hour.

Such was the result of an experiment to determine a point which was raised as far back as 1833, which was never lost sight of by the Resident of Indore, which the Bombay Government supported with alacrity, vigour, and prudence, and which involved no small amount of peril and enterprise to the energetic officers who undertook it.

DESCRIPTIVE DETAIL OF THE MINERAL RESOURCES
OF THE
NERBUDDA VALLEY.

MINERAL RESOURCES OF THE NERBUDDA VALLEY.

REGARDING the mineral resources of the Nerbudda Valley, there may be said to be the minimum of accurate information; and until a scientific geological survey by qualified officers regarding it is instituted, it must remain to some extent conjectural.

The estimate formed of them is, however, large,—the latest reporter, Mr. Jacob, declares them to be inexhaustible; and certainly, in variety, and extent of space,—comprising two hundred miles in length and thirty-one in width,—identity of geological formation, and other accessory characters, have any weight in leading to an assumption, it is not ill-founded.

It is, however, chiefly in the upper basin, between Jubbulpore and Hindia or Dharee, that the principal mineral products abound, though they are not wanting further down in the lower; and their order, both in respect to geological succession, and to the more important relation of commercial utility, renders this portion of India (circumscribed and excluded as it is, by distance and want of roads, from intercourse with the seats of commerce) probably the most favoured of any known district, and on a par, if not more advantageously circumstanced, in some respects, than the richest coal district in England, viz. Dudley, where, as at the Nerbudda, the combination of fuel, flux, furnace clay, and metallic germe, exist side by side. Irrespective of the fertility of the soil, with its abundantly productive crops of every description, which have not been in the least overrated; of the grains which, for want of market, sell for 120 to 160 seers per rupee; of the dyes, sugar-cane, cotton, opium, and oil seeds; astringent barks and aromatic plants; of the proximity of forests, which furnish timber of the most enduring nature for building purposes, as well as denser kinds for charcoal and rougher work, also lac, gums, and resins: independent of these, which form no inconsiderable item of at least local transport, the mere mineral and natural productions certainly appear inestimable, if not exhaustless.

Besides coal and iron, many minor but profitable and much needed productions exist: lithographic stone and statuary marble near Beethārī Ghat and Ponassa; roofing slate thirty miles from the river at Kuan; also traces of copper, and it is said of antimony, near Hurda. The former, however, and their associated rocks, are the most material; and seem to belong to, and to be

contemporaneous with, the great belt of coal which stretches across India, from Arracan and Rajmahal east, to Kutch west. It traverses the entire continent, forming the fields at Cherapoonjee, Burdwan, Palamow, and Sohagpore and the Nerbudda, and follows (if its appearance is not dependent on) the great volcanic energy which was excited in this direction. In the last-named place it occurs, as usual, in troughs, about 1,000 feet above the sea, and is an example of the generic law, that the best coal is that found at the greatest altitude, having been formed at the greatest depths, and been upheaved with the rising of the mountains on the flanks of which it outcrops.

The Cherapoonjee coal, 4,300 feet high, affords an illustration, being ascertained to be the best in India; and with it the Nerbudda coal is identical in character, and associated rocks. In the upper basin of the Nerbudda, it is found in numerous places, but at three principal spots: at Jubbulpore itself; Lemáta Ghat, where the Nerbudda runs through a vein; on the banks of the Sakur and Towah rivers, and their feeders,—at Mowpáni and Kotra on the former, at Sonádeh and Mardanpore on the latter. Also at Patroda, and around Hooshungabad, where it is supposed to abound, the most distant fields not being thirty miles in a direct line from the river. Further and more diligent search would doubtless lead to the discovery of many more seams; for the whole valley, though undulating, is of the same geological character, with limestone underneath,—affording a further proof of the nature of the Nerbudda coal as applied to Indian fields,—the best being found so; those in which inferior coal appear, as Burdwan and Rajmahal, being devoid of it. Up to the present time, the only connected description of the Nerbudda coal is that given in the Coal Committee's Report, published ten years ago. The three beds as above, are reported to have the same geographical character as the Cherapoonjee and the best Scotch Clackmannan coals; they are from one to forty feet thick, alternating with sandstone and shale of various thickness. The outcrop is everywhere close to the surface, and is often exposed by rivers, whose beds intersect it: this occurs both at Sonádeh and Mowpáni. The field at the latter place is not far from Gurrawara. The seams are said by Colonel Ouseley to be from twenty to forty feet thick, by which it may be presumed is to be understood the total thickness of all the seams, and not individual ones. Mr. Jacob makes the three seams as follows:—

First	8 feet 6 inches thick,
Second	3 „ 6 „ „
Third	6 „ 3 „ „

Total.. 18 feet 3 inches;

and all highly inclined, owing to trachyte veins; he characterises them as highly bituminous lignite, having no sulphur, and little residue. They are found on both banks, from 20 to 25 feet in depth, 84 yards in width, and 127 yards in length along the river, with only 6 feet of sandstone above. The Kotra bed, near the

confluence of the Hurd and Sakur rivers twenty miles eastward from Benár, has three seams from one to four feet thick. At Jubbulpore station, coal occurs at a depth of seventy feet, also at Lemátá Ghat.

The Bethári Ghat cuts a pyritous coal-field, inclined at an angle of 80° , overlaid by dolomite, and the analysis of both shows the properties to be as follows:—

Sp. gr.	Vol. Matter.	Carbon.	Ash.
1.49	50.0	47.1	2.9

At the Towah field is the mine which was worked by Sir R. Hamilton, close to Sonádeh, and thirty-four miles from Sewnee; coal exists also at Mardanpore, forty-two miles from Shahpoor, in seams of twenty-one and twelve inches thick. The superficial limit of the former is said by Mr. Jacob to be fifteen miles by seven, at an angle of $7\frac{1}{2}^\circ$ N by E., and twenty inches thick, between layers of shale and sandstone, and covered by a coarse sandstone thirty feet in depth, with a deposit of fine clay. Three or four fields in this neighbourhood are exposed by the nullas, and it was from these and the Benár fields that the specimens were sent by Colonel Ouseley and Sir R. Hamilton to Bombay, for trial and analysis.

From the above outline, it may be supposed that the seams are of the kind best suited for mining: the pits are shallow; and as depth regulates the power and diameter of machinery, no extensive working will at first be necessary;—elaborate means for ventilation and drainage may to a certain extent, therefore, be dispensed with, as these operations can be effected by more simple contrivances. The water-power from the neighbouring nullas would be the supply best adapted; but Mr. Jacob asserts that the drainage may be effected still more simply by adits. Colonel Ouseley and Mr. Jacob, speaking from personal inspection, believed the resources to be as unbounded as the most sanguine could imagine. From the thickness of the seams, it may be surmised that they are equal to the most extensive demands that can be made on them for years to come.

The quality of the Nerbudda coal enhances the value of these opinions. It has on all hands been admitted to resemble the Cannel coal of the British or Scotch mines, and is consequently a bituminous variety. However much high authorities may differ as to the value of a chemical analysis of coal, and its bearing on the calorific powers of given specimens, yet as all artificial heat is obtained from, and depends on, the combination of carbon and gaseous products which a coal contains, those specimens in which they are determined to exist in the largest quantity, and show a minimum of ash, or incombustible and infusible material, must be the best adapted as fuel; and it has long been settled that a bituminous coal, in consequence of the heat evolved by the volatile combustible matter (the important element of hydrogen being three times more powerful than the carbon itself), gives 20 per cent. greater heat than from its own coke, which is chiefly advantageous for its great weight comprised within the small space it occupies, and for the expulsion of sulphur

and impurities in its manufacture. The Nerbudda coal has, however, had the advantage of the minute analysis and induction of the chemist as well as the practical knowledge of the stoker; which latter may be assumed to be the most essential investigation, intelligent stokers only being able to treat fairly and openly different kinds of coal, according to the very different modes of firing each needs: a coking and gaseous coal, for instance, not taking above a few inches of fuel in the bars, and small supply of air; a carbonaceous variety, as anthracite, requiring twelve and fourteen inches, and large supply of air. The Coal Committee determined the coal to consist of—

COAL.	Density.	Carbo	Gaseous and Volatile Matters.	Ash, and Mineral Constituents.
Benár coal	1.49	47.0	50.0	2.9
Jubbulpore coal	1.30	37.0	59.0	4.0
Dr. Giraud's analysis of former	..	41.0	34.0	24.0
English West Hartley .. ..	..	54.0	37.0	8.0
Sonádeh coal (Dr. Giraud) .. ..	..	38.7	35.3	26.4
Edinburgh coal .. ..	..	67.5	17.8	14.5
Dr. Ure's ditto .. ..	..	57.0	37.6	5.0

The Indian specimens, with the exception of the first two, would seem to have been inferior, and were known to have suffered from exposure to heat and damp a long while, and to be pulverized. The analysis of such would necessarily be unfavourable, and the quantity of ash large; on the above grounds therefore the comparison was scarcely fair. The Benár coal sent by Colonel Ouseley had, previously to the last analysis by Dr. Giraud, been tried in comparison with Glasgow coal practically on the *Indus* steamer, in Bombay harbour, by Captain Turner, with engines of 60 horse-power, 3-feet stroke, 4½ feet in diameter, giving 26 revolutions in a minute, and for a distance of 22 miles, with and against tide, with a speed of 9½ miles, and 2½ hours employ, and the result was:—

COAL.	Time in getting up Steam.	Quantity of Coal used.	Ditto per Horse-power.	With both Boilers, of same Coal, per Horse-power per Hour.
	Hours.	Cwt. lbs.	lbs.	lbs.*
Glasgow	3	5 20	19½	13.96
Nerbudda	1½	2 92	10½	11.65

The Nerbudda coal was therefore 83 per cent. better in raising and keeping up the steam than the Glasgow coal. It gave little ash; but its defect was a good deal of clinker on the fire-bars, having been taken indiscriminately dust and all, to which it was reduced by distance, being carried on bullocks, and thrown down and loaded daily.

Mr. Johnstone, in a single trial of the Sonádeh coal at the mine, with an open fire, found it equal to Scotch, and without residue; and Mr. Jacob states it to have no sulphur, and little ash. Sir R. Hamilton had previously sent a

quantity to Bombay that had been excavated by Mr. Conybeare at Sonádeh; it was tried in the Steam Factory, and gave the following result:—

	Best English Government Coal per Horse-power.	Nerbudda Coal ; Average of two Trials.
Time in getting up steam	38 minutes.	37½ minutes.
Consumption in that time	82 lbs.	72 lbs.
Time in evaporating 33 gallons of water	30 minutes.	30 minutes.
Quantity used in ditto	23 lbs.	28 lbs.
Residue below bars	18 lbs.	11 lbs.

Captain Lynch, who conducted the experiment, reports that it got up steam quick, burned clear, left little clinker, and not more than a fair proportion of ash; that it was scarcely inferior to the best coal Government used, and was very good for general steam purposes. A third trial was made by Lieutenant Grounds, in the *Medusa*, which resulted as favourably when sifted:—

	Nerbudda, Sifted.	English.	Nerbudda, Unsifted.
Time in getting up steam	71 minutes.	85 minutes.	62 minutes.
Absolute consumption of wood and coal. {	56 lbs. wood. 336 lbs. coal.	56 lbs. wood. 301 lbs. coal.	56 lbs. wood. 360 lbs. coal.
Consumption per horse-power for 7 hours' steaming, with pressure of 4 lbs.	7.60 lbs.	7.85 lbs.	9.20 lbs.
Ash clinker per lb. of coal	0.210	0.204	0.434

The great defect in reference to the Nerbudda coal is, that with such excellence in the mineral itself, and such reputed advantages for mining, the information regarding the amount available for an extended supply should be so bare. Beyond the assurance that the coal is to be found in several places,—that it is close to the surface, and of good quality,—there is literally nothing upon which a miner or capitalist would act, or that would justify him in commencing operations. As competition, after all, is the climax to which all computations have reference, as well as the incentive to enterprise, and it is with the English market and companies that India has to do, the data, to satisfy them, ought to be tangible and close, and the information minute and precise,—the great desideratum being to render Bombay independent of England in respect to coal, both in point of time, cost, and quantity. Under existing circumstances,—with the Nerbudda closed to navigation, except for three months of the year, and with trunk roads few,—the transport of coal to Bombay is not to be thought of by the latter; it is a six weeks' journey, and the cost about Rs. 80 per ton on bullocks. By the imperfect and unsafe route of the River in the monsoon, Sir R. Hamilton computes that it could be carried from Sonádeh to Tullukwara for Rs. 20 per ton; but the loss by swamping of

boats, which equalled one-third, has been left out of calculation; also the cost of mining, estimated at the unprecedented rate of 9 annas per ton; likewise the conveyance from Tullukwara to Bioach and Bombay, computed to be 10 annas per maund, or Rs. 17 per ton, independent of the risk and injury to the coal from exposure, wet, frequent portage, pulverization, &c. &c. To the railroad, therefore, and to it alone, can expectation be directed; and even with the expedition and cheapness that attends its establishment, it involves an extremely nice calculation whether the Presidency market, where the chief source of expenditure of Bombay is centred, can be rendered independent of England at the same prices. The consumption of coal at present, though affording no criterion for the future, is about 3,500 tons per month, as detailed below, costing, exclusive of waste, from Rs. 16 to Rs. 26 per ton, which is equivalent to about Rs. 10,00,000 per annum.—

Great Indian Peninsula Railway Company	80 tons monthly.
Peninsular and Oriental Steam Navigation Company.	1,100 "
Government	1,200 "
Bombay Steam Navigation Company	300 "
♦	
	Total.. 2,680 "
Mint, and other factories.....	100 "
Small steamers	120 "
Out-depôts	600 "
	Total.. 3,500 tons monthly.

By the Great Indian Peninsula Railway line, Mr. Beikley makes the distance from Bombay to Sewnee (thirty miles from the nearest coal-fields on the Towah) 438 miles; to Garilwara (ten miles from the richest Benā or Mowpāni) 532 miles; average 485 miles. Now it may be assumed that the very lowest *remunerative* rate at which a railway could afford *at first* to carry coal, or any merchandize for long distances, would be 1*d.* per ton per mile. Some English and American lines do it for 1*d.*, and even 1/2*d.*, but scarcely at the first outset, as it is a charge which none but a highly prosperous company can endure, except for particular and local purposes, and short distances, since every mile of length augments the cost, by the necessity of carrying back storing carts, unless the upward traffic is extensive. The Great Indian Peninsula Railway (and also the Baroda Railway) mileage rates are put down at 2*d.* per ton per mile; but the Bengal Railway, having a strong river competition to contend with, have already reduced their charges to 3 annas per maund, or Rs. 5 per ton from the Burdwan coal-fields to Calcutta, 120 miles, that is 1*d.* per ton per mile; at that figure conveying 300 tons daily: the Bombay estimate would be about 150 tons.

This item alone, therefore, at the above computation of distance, and the lower rate of 4*d.*, at once fixes the high figure of Rs. 20 per ton for the coal landed in Bombay, irrespective of the cost of raising it at the mine, which Sta.

R. Hamilton states to be 9 annas per ton,—a proportion which has no relation to that of any English mine, which is at the lowest from 3s. to 5s. per ton. Eventually, doubtless, the mileage rate will be reduced to the lowest figure at which it is possible for the railway to work; and it will be more than something gained to feel that India can be independent of wars, and the fluctuation in freight which the discoveries and openings of other countries impose on her. Some years ago—and not in a season of pressure—Mr. Crawford, the Accountant General, calculated the cost of English coal to Government at 15 annas per maund,—about Rs. 25-4-0 per ton; which will probably be found to be little above the average, when all sources of loss and damage are taken into consideration. By no other means than the railroad can the coal of India ever be brought within this sum; for with every latitude and allowance for the difficulties of the Nerbudda, the expense of river carriage is about Rs. 37 per ton, exclusive of the great proportional losses of time, uncertainty, and the establishment of depôts, which there seems no reasonable method of lessening.

The principal causes of the low price of English coal in India are the cheapness of delivery at the mouth-pits, and of the freight out, which used to be compensated to shippers by the freight home. In the first of these, the Nerbudda coal is computed to have the advantage; in the second the reverse, as just shown. Unless unforeseen causes (which are not legitimate, because speculative grounds for rational conclusions) should occur to raise freights, and obstruct trade, it will be dubious whether the Presidency at least can for some years be rendered altogether independent of England. Sir R. Hamilton estimates that at the Sonádeh pits 35 tons per day could be raised at each shaft, or 10,920 per annum, on 313 working days; four or five shafts in full work would therefore be necessary to meet the present necessities of the Presidency alone. But this scarcely lessens the immense importance that the coal-fields open out to the railway itself, as a great impulse must be given to trade by the employment of capital, even on a limited scale. The extension of the rail also, northward and westward from the Nerbudda, to which coal would otherwise have to be conveyed from Bombay, will call for a large consumption for all the branch lines at any distance not exceeding 200 miles from the Presidency. The presence of coal will likewise enable mills for the sawing of wood to be set up; also machinery for working and draining mines; and not least, will supply the great and urgent want felt in all other parts of India, wherever iron is found, viz. fuel for smelting the ore close to the mines, and in abundance. This has been one of the great obstacles to the Porto Novo works, and compelled the erection of saw-mills at the Baipore foundries; and it is in this peculiarity, and that of the approximation of fire-clay for furnaces, and flux for the mineral, that the chief and peculiar value of the Nerbudda Valley lies.

To exhibit the essential advantages, and almost indispensable necessity for the establishment, on scientific principles, of these resources, Colonel Kennedy gives a statistical account, affirming that the difference of cost on his line would be nearly £3,000 per mile. viz. £4,000 for Native against £7,041

for English material; all things taken together, a certain saving by Indian iron of £1,500 per mile. Leaving out of calculation the application of iron more largely in all public undertakings, as in bridges, piles, and other structures attainable to Indian iron, the superiority of Native local iron consists in the saving of freight from England, and in the mining operations; the quality of the iron, the proximity and abundance of flux, fuel, and cheap labour, affording most favourable and unquestionable conditions. Mr. Berkley states that the cost for a single line of permanent way varies from £2,810 to £3,160 per mile, half of the mileage of each section arising chiefly from the high prices of English iron material, and the great expense of conveying it from the port to the interior of the country; and this points to the great advantage of expediting the establishment of Native ironworks, which on the Nerbudda are enhanced by the valuable character of the iron; and though the axiom of Mr. Berkley in the 67th paragraph of his Report is most assuredly true, that their utility must depend primarily on the means of transport, yet doubtless very much can be effected by promptness and energy, as tons of chairs, spikes, and even rails, may be in readiness long before a locomotive reaches the Valley of the Nerbudda. The amount of iron through the whole of Central India is scarcely known, and has never been attempted to be ascertained or fixed. For ages it has been worked in the Nerbudda Valley, at Kautkot, Chandgur, Bauglee, Tendukheira, and further down at Baug, and twenty different places in the Jubbulpore district, for local consumption. This has been done in the most rude way, with little providential attention to the product, which is pretty much the same all over India; and it may be assumed that the ore is naturally rich, easily extracted, and the fuel employed good,—three of the most material points needed elsewhere. However, the cost of transport and want of skill and appliances have interfered with its price, and with the demand; and English iron and steel, both wrought and cast, in convenient shapes and sizes, beats it out of the market. Mr. Jacob, of the Baroda Railway Company's establishment, has recently entered more fully into the statistics of the Nerbudda iron, and has reported other fields at Ponassa and Makeraban. He seems to have visited those already named, and considers them rich to a degree. At Kautkot, in Holkar's territories, on the north bank of the Nerbudda, the variety is that of brown ironstone hydrated peroxide, yielding to the dry process 37.22 per cent., which ought by theory to be more. It is worked unfavourably, without flux, and silica being abundant, absorbs one-third nearly of the metal. The yield by the Native method is one-fifth, and 80 per cent. of loss, the charcoal being in the proportion of 4 to 1. With better appliances, this might be reduced one-half. The price of iron ore is 4s. 6d. per ton: of charcoal 9s. 6d. per ton; when worked £6. 16s. 11d. At Chandgur the iron is reported to be red hematite, a still richer ore, which occurs in holes from six inches to ten feet deep, but friable, owing to the disintegration of metalliferous rock below. It is easily dug, and the veins exposed, every stream bringing down quantities. The Nerbudda cuts

four veins, 122 feet broad, which are perpendicular to the bank. At Tendukheira it is also a red hematite; at Penaghur, near Jubbulpore, micaceous and specular, and consequently rich; at Burwye very silicious, and poor. At Ponassa, two miles west of the town, iron is described as loose, and to be collected on the surface at the rate of 1s. 3d. per ton, and associated with dolomite, a bed of which, four miles in extent, exists. No shafts or pumps would, it is said, be required for working the mines, which could be drained by adits. The dolomite is a short distance from the coal-fields, and good water abundant. At Baug, the ore has more the character of the clay iron ore of the coal-measures, which (conjecturally) all the iron of the valley might be supposed to be, but for the volcanic agency and its greater richness. Coal cannot be far off at Baug, from the carbonaceous colouring of the sandstone, and presence of ironstone and indurated clay around. The Baug ore yields by quantitative analysis, according to Dr. Giraud, 40 per cent. of ore,—about the per-centage of clay iron ore; it is very argillaceous.

It can scarcely be denied that these estimates, rough though they be, furnish ample grounds to justify a commencement at least; and if the value of iron depends on the richness of ore, facility of extraction, and the existence of eligible adjuvants, no more favourable conditions could surely exist. Want of transport is the only impediment which may retard for a time the availability of the product; but as soon as the most recent improvements and machinery, which cheapen and expedite iron-working, are capable of being introduced,—such as Mr. Neison's hot blast, which reduces the consumption of fuel nearly one-fourth; the economizing of waste gases on the continental plan; the American process of pulverizing the ore and charcoal, rapidly deoxydizing the former; and the application of electricity to iron while hot, enabling it to imbibe carbon, and converting it by the shortest process into cast-iron or steel; Nasmyth's hammer, &c.,—the full capabilities of the Nerbudda Valley in this particular mineral will be appreciated. It is argued that the ore is too pure; that, as in the Porto Novo mines, it will, in the absence of complicated machinery, either be more advantageous to send it to England, or too expensive to cast it; but it is forgotten that the purest wrought-iron is as much needed for rails as cast-iron, and that it may be run into any shape by very simple and inexpensive means; and also that for cast-iron, poorer or inferior kinds are absolutely requisite, and are named and specified by scientific engineers to ironmasters—chairs and girders having their known proportions of pure and inferior metal. By the Native method in Central India, the ore is never roasted or pounded: they use pure and dense charcoal, sometimes in equal proportions, oftener at 3 and 4 to 1 of iron, the former placed on the hearth of the furnace, which, being small and limited, and the blast constant and forcible through it, the iron, and a great part of the slag, run out together in from ten to twelve hours, and the latter, being soluble in much less heat, spurts out in hammering, and is got rid of; the metal imbibing little of the carbon. Were the process which is adopted in other parts of Central India,

of pulverizing the metal and coal used, and placing it in layers or balls, and inferior iron selected, the ore would, in having to pass down through layers of several feet, take sufficient carbon for any purpose, without any expensive machinery at all. For coal a quicker and more powerful blast is of course required than for charcoal; but even if portable land-engines of from 10 to 20 horse-power could be applied or transported, water-power is so plentiful as to suit most purposes, at least until weighty machinery can be brought to bear. In short, very little reasoning need be adduced to show that with the metal computed at 1s. 3d. a ton, a non-sulphureous coal at 9 annas, or even ten times that, flux and fire-clay at hand, and fuel not twenty miles distant from any mine, an ore rich enough to dispense with roasting, and a loss of about 80 per cent., every inducement exists to railway companies to explore carefully both the coal-fields and iron mines, and to bring them speedily into operation.

Regarding the subject in its broad light,—the improvement of the country by employment of capital, and the impulse to industry that will be generated; and setting aside the commercial success and profit that is anticipated,—there is abundant reason to concur with Mr. Berkley, that no statistics could present a correct estimate of the traffic that would be created if the Nerbudda Valley possessed a communication with the ports of Kutch and Bombay.

As an instance of the creation of it, by the opening of trunk roads, that of the Kilner Ghat may be named, the tolls of which in ten years, that is since its opening in 1845, have been multiplied ten-fold, from Rs. 6,000 to Rs. 60,000. By similar means, brought into operation through Nimar, under the management of Sir R. Hamilton and Captains Evans and Keatinge, the trade of one line of road in that province, the growth of five years, amounts to 12,000 tons, and 26,000 passengers. On the Kilner Ghat Road, the traffic is nearly 100,000 passengers in a year, 25,000 laden cattle, and 18,000 carts. Considering that fifteen years ago the imports and exports of Nimar were known to be Rs. 5,60,000, and the transit merchandize north and south Rs. 2,95,200, excluding, however, the opium for China, and piece goods to Central India, and that the Sangor and Nerbudda Territories at the same period yielded transit dues Rs. 70,00,000, in imports and exports Rs. 5,50,000, and in duty Rs. 3,16,675, of which the present trade of one district, Jubbulpore, is said to be 26,000 tons, some estimate may be formed of the attraction a railway is likely to cause and possess. That the line selected by the Great Indian Peninsula Railway Company, and adopted by Colonel Kennedy, possesses these to the full, admits of little question; and Mr. Berkley's assurance to that effect* needs little support. When, by the labours of such energetic officers, so little* is left discretionary or dubious, and provisionary precepts are admitted and satisfied, expectation largely points to the rational assent of the ruling powers.

* Vide extracts from Mr. Berkley's Report, contained in a subsequent part of this Selection.

ANALYSIS

OF THE

PAST CORRESPONDENCE OF GOVERNMENT

ON THE SUBJECT OF THE

COAL-BEDS IN THE VICINITY OF THE NERBUDDA;

AND OF THE PRACTICABILITY OF THE NAVIGATION
OF THE RIVER.

COAL-BEDS IN THE VICINITY OF THE NERBUDDA.

THE records submitted for publication may be beneficially summarised and detailed, each subject being pursued and connected throughout the correspondence, which opens with a letter from Major Ouseley as far back as November 1838, to Major Felix, Private Secretary to the Governor of Bombay, forwarding 206 bullock-loads of coal, which, from the Coal Committee's Report, appears to have come from the Benár fields for trial in Bombay. It was imagined to be anthracite, and taken at random from the exposed seam.

The expense (being at the rate of Rs. 80 per ton, viz. 10 bullocks at Rs. 8 each, carrying one ton) was justifiable as an experiment; but the method adopted to carry it out precludes at once, and for ever, any such system in future. On a most fair and impartial trial for two hours and a quarter in Bombay harbour, in a small Government steamer, (Glasgow coal burning in opposition,) the Nerbudda coal was found to raise steam quicker, with about half the expenditure, being as 10½ lbs. to 19½ lbs. per horse-power: there was little ash; but the objection was, that there was a good deal of clinker on the fire-bars, accounted for by the pulverization the coal had been subjected to by the mode of conveyance.

The Bombay Government at once took up the subject, and in reporting on it to the Honorable Court, recognised the importance of the proximity and value of the Nerbudda coal; the Supreme Government was at the same time requested to authorise measures to give full effect to bring the coal into extensive use.

The Court of Directors likewise regarded the experiments with favour, and recommended further trial with Slangennach, Lewis Crown Valley, and West Hartley coal, which they consigned to India for the purpose: they however feared rather than encouraged the natural difficulties of the journey. There seems no record whether these intentions or experiments were ever carried out, though the subject was again mooted in 1841. In that year Government, on a letter from the Assistant Commissioner in the Saugor and Nerbudda Territories, addressed the Collector of Broach, requesting to know the cost of coal from Tullukwara to Bombay, which was found to be 10 annas per maund, or Rs. 17 per ton. From the report of the Accountant General, Mr. Crawford, it also appeared that English coal cost at Bombay Rs. 25-4-0 per ton, or 15 annas per maund, hamallage not included. Government, however, authorised the Assistant Commissioner in the Saugor and Nerbudda Territories to send fifty or a hundred tons of coal down the Nerbudda, experimentally.

In 1844 the Military Board, to whom reference was made, reported that they considered the important point was the means of transport; and as no coal existed in the Bombay Presidency, recommended either a railroad or the opening of river navigation, believing that where obstructions in the latter existed, they might be obviated by portage along the banks. In respect to railroads, they stated that these involved a consideration of the general traffic of the country, on which no information was before them. Dr. Giraud at this period analysed specimens of the Nerbudda coal in conjunction with some from Kalabagh, Attock, and English Cannel coal, and found it abounding in combustible hydrocarbonates, but deficient in carbon, with a large quantity of ash; which properties demonstrated it to be a good gas-producing coal.

In 1847 Sir G. Clerk, acting on a letter from Sir R. Hamilton, Resident at Indore, took up the subject again warmly, and ordered a trial of some coal from the Sonádeh field, 150 miles lower down the valley, which had been obtained by Mr. Conybeare at Sir R. Hamilton's instigation. He directed the result to be sent to Sir Robert, with a request for further information from him, likewise soliciting the opinion of Sir R. Oliver, Superintendent I. N.—Captain Lynch, I. N., who was appointed to conduct the experiment, in handing up his Report of this coal, says that it got up steam quick; burned clear, with little clinker, and not more than a fair proportion of ash; and that it was little inferior to the best Government coal, and well adapted for Government purposes. The figured statement which he forwarded showed that its heating powers were as quick as the best Government coal, the consumption being 12 per cent. less, and the residue below the bars one-third less. There may be introduced here a further trial, in 1848, by Lieutenant Grounds, I. N., who reported unfavourably of the coal, viz. that it left a large amount of clinker in proportion to English coal, showing a great quantity of incom-bustible material, and that it stopped draught, by being soft, and spreading over the bars. This was the coal brought down by Captain Fenwick; it gave, however, a much better result on being sifted. The Resident of Indore upon this urged a further trial, which was conceded by the Bombay Government, and Captain Lushington, Superintendent I. N., after again subjecting it to practical tests, considered the Nerbudda coal in all respects equal to the best coal usually imported for the use of Government; he conceived it a great acquisition, rendering Government independent of foreign supply. The only drawback was its great state of pulverization, which, when sifted, gave most satisfactory results, as follows:—

	Time in raising Steam.		Consumption per Hour, per Horse-power.		Ash and Clinker.
	Min.		lbs.		
Nerbudda coal, sifted	70		7.60		0.210
English coal . . .	86		7.85		0.204 •

The Resident at Indore, on receipt of this, urged the propriety of excavating and working the coal, in order to avoid the chance of a short stock in Bombay. He applied for the services of a qualified miner, and obtained those of Mr. Johnstone, of the Indian Naval Department, who joined his camp on 15th January 1848, and proceeded with him to the Sonádeh fields, which were half a mile from the village of that name, on the Bohra nulla, thirty-four miles from Sewnee, with a bad pass at Nandwára, hardly practicable for carts. Mr. Johnstone subsequently hit upon a better route, avoiding this pass, which Captain Fenwick afterwards travelled over, and which it was calculated could be made practicable for Rs. 500, *viâ* Peepliah, Gowásing, and Mukrái, to Dharee, the point on the Nerbudda below the fall which it was desirable to fetch.

Sir R. Hamilton left with Mr. Johnstone full instructions to ascertain the limits, depth, and all particulars regarding the coal, and its associated iron, and directed other places to be searched. His personal observation determined him to raise 20 tons; and for this purpose he directed the sinking of an experimental shaft, for which he furnished Mr. Johnstone with means and tools, and obtained the assistance of Captain Fenwick, a retired and energetic officer of the Nizam's army.

Mr. Johnstone reported the iron equal to the black main of Scotland; the coal to be in beds of twenty inches thick, at an angle of $7\frac{1}{2}^{\circ}$ N., between layers of shale and coarse soft sandstone, thirty feet of which were above the coal. He pronounced it, on trial on an open fire, to be equal to Scotch, as it burnt without residue,—a fact opposed to the chemical analysis of it, which gave a large amount of incombustible material. He described the limits of the basin to be fifteen by twenty miles. He also visited the Mardanpore fields, referred to by Colonel Ouseley, two miles from Bohra, in the bed of the Sookee nulla, about 100 yards from its junction with the Towah: the seam of coal here was two and a quarter feet thick, sp. gr. 1.229, at an angle of 20° in a NW. direction.

Sir R. Hamilton calculated that the coal thus obtained could be deposited at Tullukwara, three days' sail from Broach, at Rs. 20 per ton, viz:—

Transport to Dharee from coal-fields....	7	annas per maund.
„ from Dharee to Hurun Pall ..	2	„
„ „ Hurun Pall to Tullukwara..	3	„

—
Total.. 12 annas; independent of

the expense of working the shafts.

After the shafts had been sunk, and the required quantity raised, considerable time was occupied in arrangement with the Brinjárees; with whom it was so difficult to deal, and upon whom it was so impossible to depend, that it was thought as expedient to make a rough cart-road, avoiding the Nandwára Pass, as no inducement could persuade them to do otherwise than throw off their loads, as if they were grain, which was better adapted to their bullocks than the angles of the coal. Captain Fenwick, with a great deal of tact and patience, at length induced the Brinjárees to proceed, and succeeded in transporting to

Dharee, a distance of 100 miles, 462 maunds (about 17 tons) of coal, on 226 bullocks, each bullock thus carrying 140 lbs. or $1\frac{1}{2}$ cwt., at a cost of $6\frac{1}{2}$ annas per maund, or Rs. 11 per ton.

From the experience gained in sinking the shafts, an estimate was formed of the cost of one large enough for pumps. These Mr. Johnstone calculated would be Rs. 6,344 per annum for each shaft; from which 35 tons could be raised daily when fairly at work, i. e. 10,920 tons per annum, at a cost per ton of 9 annas and 4 pies. The shaft it was assumed would be sixty feet deep, and could be drawn with bullock-power, or a small steam-engine. The proceedings so far were reported to the Bombay Government, who most promptly acted on them. In a most able and statesmanlike minute they thanked the Resident for his exertions, recognised the importance of the subject, irrespective of the eventual result to steam, marine or railroad; they offered all the encouragement in their power, which was limited to permission for Mr. Johnstone to remain as Superintendent, and to placing Rs. 10,000 at Sir R. Hamilton's disposal, to be expended as his increasing experience might dictate; they hinted that more should not be done to roads than mere clearing. Urging economy, they proposed that search should be made for other coal-beds nearer the river, and as there was no immediate want of coal in Bombay, recommended magazines to be formed at different spots on the Nerbudda, and the coal to be floated down to each, as time and conditions would admit; they suggested to the Resident's consideration the subject of leasing the soil, and the right of working the mines, and asked for information on the tolls and customs on the banks of the river, and in transit.

The Resident, in his reply, furnishes an estimate of the proposed shafts, which he divided into three departments:—

One of superintendence, at.....	Rs. 700	monthly.
One of transport, at	300	„
One of establishment for shafts, at	532	„

Total..Rs. 1,522 monthly ;

the latter comprising miners, carpenters, bullocks, and drivers, &c., which only it would be requisite to increase with each shaft. Thirty-five tons per working day was still adhered to as the quantity that would be raised.

The Resident further reported the arrival of the coal packed in 386 bags at Chikulda, 150 miles from Broach, on the 20th April, in fifteen days from Dharee, and requested a steamer of light draught, if unemployed, to be sent, to take in the coal at Broach. He likewise submitted Captain Fenwick's journal of the voyage down 110 miles of the river.

Government again freely responded to the call, by authorising the steam-vessel, and applying to the Honorable Court for the continuance of the services of Mr. Johnstone at the coal-fields. They desired, however, not to be committed to a year's undertaking in the existing and imperfect knowledge of the situation of the river, and requested the Resident to feel his way. They submitted a summary of all proceedings up to that period to the Supreme

Government, with a strong recommendation in favour of the continuance of the undertaking.

Though Captain Fenwick reached Chikulda in safety with his cargo and fleet, which consisted of ten boats, thirty feet long, six feet in breadth, and drawing two and a half feet of water, each carrying about two tons, his voyage down this 110 miles of river, accomplished in fifteen days, was not altogether without difficulty. Its general character was a rapid shallow stream, deep above, and opposite the fords with rapid descents: from six inches to two feet of water existed over these channels, which were winding and tortuous. Between Dharee and Mundlaisir he had to let the boats down with ropes in four places, and at the falls of Sahesur Dhurah they were emptied, and the coals carried overland for about 600 yards. Boats drawing above one foot of water could only be used with ease. Sahesur Dhurah was the only direct fall in this portion of the river, and had a back-water channel, which rendered it less difficult than it otherwise would have been.

Arrived at Chikulda, Captain Fenwick stored his coals in a godown attached to the bungalow at that place, and proceeded fifteen miles down the river, to examine the Hurun Pall, the next formidable pass. He found it simply a deep narrow gut or sluice, between high rocks, with eight feet channel in the middle, and no fall; it had only six inches of water in several places, and laden boats of a draught of a foot and a half, of the length and beam of his own, could not possibly pass, and even empty ones would have to be lifted. He found (what Captains Anderson and Evans had reported) that it was not at the Hurun Pall, but a quarter of mile below it, that the great obstacle existed—the Balaghori rapids. In April (the dry season) there were three falls of a hundred yards each—the first of six, the second of three, and the third of four feet in thirty; with ten feet passage in mid-channel, in which pointed rocks jutted. The force of the current was intense, with, however, a deep back-water on the left hand. Judging it, even with this outlet, impracticable for laden boats at this season, Captain Fenwick returned to Chikulda, and by orders took $1\frac{1}{2}$ tons of coal on two carts to Kumálee, below Tullukwara, which he reached in fourteen days; there he took boats again, and arrived at Broach altogether in twenty-one days from Chikulda. The précis furnished by Sir R. Hamilton of this part of the proceedings was pretty much the substance of Mr. Johnstone's Report before alluded to, together with the data furnished by Captain Fenwick.

The Sonádeh coal was found on the left bank of the Bohra nudee, at an angle of $7\frac{1}{2}^{\circ}$ N., and associated as follows:—

	Feet. ins.		
Sandstone	30	0	coarse-grained; soft.
Shale	0	4	
Coal.....	1	7	
Shale	0	4	repeated; the lower

Formation being a closer-grained sandstone.

Captain Fenwick, with 462 maunds of coal, on 226 bullocks, it appeared—					
Left Sonádeh on the 9th Mar.,	reached Dharee,	100 miles,	25th Mar.,	in 16 days.	
„ Dharee 5th April,	„ Mundlaisir,	50 „	9th April,	in 4 „	
„ Mundlaisir 10th „	„ Sahesur Dhurah,	6 „	14th „	in 4 „	
„ Sahesur Dhurah 16th „	„ Chikulda,	50 „	20th „	in 4 „	
„ Chikulda 27th „	„ Tullukwara,	120 „	10th May,	in 14 „	
„ Tullukwara 10th May,	„ Broach,	60 „	13th „	in 3 „	

Total... 45 days.

Thus the first land portion of the journey of one hundred miles occupied sixteen days, owing to the time lost in lading and unlading the bullocks. It was undertaken at a great cost, Rs. 11 per ton, with the coal much broken and injured; ten days were spent besides at Dharee, in arranging the boat-loads. The first fifty miles of river were completed in four days, and the other fifty miles in as many more; the portage at Sahesur Dhurah occupying two, and the shallow part of the river approaching it (being obstructed by rocks and rapids) four. Further progress beyond Chikulda was impossible in dry weather. Captain Fenwick consequently proceeded by land, as already stated, taking 48 maunds (1½ tons) on two carts, *niâ* Ali Rajpore, Oodeypore, to Kumálee, and below Tullukwara, a land journey of fourteen days, at a cost of Rs. 1-7-0 per maund, which is at the rate of Rs. 38-11-0 per ton. Captain Fenwick reached Ukteysur Ghat, below Tullukwara, on his return, in six days, and Chikulda by land in twenty-eight. Sir R. Hamilton concluded by recommending depôts for the storing of coal at Dharee, Sahesur Dhurah, and Chikulda, and urged the excavation of mines.

Government in reply, while admitting the importance of the object, hesitated to adopt these measures unreservedly, and the Supreme Government, to whom the correspondence passed, deferred further operations until Dr. McLelland or Mr. Oldham could be spared to visit the localities. In a subsequent letter the Supreme Government considered the experiment expensive, and the calculations indefinite; they required fresh information, and stopped all arrangements involving expense which were not of a temporary character.

The monsoon having however set in, and the river risen eighteen feet (even then scarcely safe), Captain Fenwick left Chikulda on the 29th July with 400 maunds (15 tons) of coal, in 239 bags, stowed in eight boats, especially built or selected for the purpose. His arrangements seem to have been most prudent, cautious, and excellent. He accomplished the distance from the Hurun Pall to Mokree, eighty miles, in twelve days, the river having high banks, hills, and jungle flanking it on both sides to the water's edge. In this distance he lost three boats and 93 maunds of coal; he met with twelve most serious obstacles, in the shape of rapids, whirlpools, shoals, and pointed rocks, which latter it was impossible to avoid, owing to the force of the current. The Hurun Pall was reached and passed without difficulty: next day (at one mile below it) the Bhorekeyree rapids appeared, now converted into one, five miles in length, with thirty feet channel, not well defined, and studded with

bluff rocks, having high waves, and a rapid current, owing to the direct fall, One boat was here lost, with 38 maunds of coal. Two miles further was the Gunoe Ghat, the features of which agreed precisely with Captain Evans's Report of them in the Transactions of the Geographical Society; at a similar distance further on, the Kalukeyree ledge of rock, and the Dussána barrier, of the same nature, were successively met. On the 31st, at twenty miles, the Bheetána Ghat rapid (bad for half a mile, and also very much resembling the Sahesur Dhurah) occurred. It was two miles and a half long, the river shallow, with high cliffs striking diagonally across—the left one formidable; and half a mile below it, as usual, was the rapid. The boats were let down by ropes, and 150 bags taken out and carried. Two miles further, the Hailkuree gut was met, succeeded by the Sirkuree shoal, leading to Nunka Ghat, one of the worst in the river. On the fifth day, Captain Fenwick reached Hamp, six miles further, and forty from Chikulda. This was a notable obstacle traditionally, but Captain Evans had already demonstrated that the real danger existed in the Balaghorí rapid, a few miles down the river. This is described as being three or four miles in length,—in fact a series of descents, studded with broken rocks for that distance; and the very natural results of such, when large volumes of water of great velocity rush along between scarped, confined banks, viz. whirlpools, high waves, an unmanageable stream, and the utmost danger: two boats with 66 maunds ($2\frac{1}{2}$ tons) of coal were lost here. From the termination of this to Soolpan (fifteen miles), the river was found tolerably clear. About six miles below Soolpan the Mokree falls occurred, in three days' work from Hamp, in which difficulties of the same nature presented themselves, which were *shot* by Captain Evans, the water being higher, but in which one boat was lost by Captain Fenwick. Here the hills and jungle ceased, and cultivation began. From this to Tullukwará, thence to Broach (reached in twelve days), no material impediments occurred. Between the last-named places navigation is clear and quick up to November, and this lower portion was compared by Captain Fenwick to the Bagheeruttee or Hooghly between Berhampore and Calcutta at this season. In order to ascertain the practicability of returning to Chikulda by water, Captain Fenwick, after great trouble with the boatmen, started for Tullukwará on the 14th August, and reached the former place on the 26th September, in forty-three days; but his journal affords little information, further than that the river was impracticable against stream, of which the length of time alone is sufficient evidence.

Captain Fenwick believed there was not, on a stretch, a mile of free navigation between the Hurun Pall and Mokree; his cargo was exposed to constant showers, wet, and spray from high waves, which would have been destructive to valuable articles,—against which there is little hope of provision or improvement as regards boats, which require to be of a peculiar construction, and of exceedingly light draught; even the coal was pulverized, wet, and lost much of its essential qualities. Of his whole cargo of 462 maunds (17 tons),

nearly 100 maunds were lost by the swamping of boats; 48 maunds were taken overland, and the rest, 11 tons 10 cwt., landed at Broach.

Sir R. Hamilton, in reporting this, conceives that though difficulties in these eighty miles might be facilitated by science and skill, and the removal of some obstructions, the foregoing details, the close and hilly nature of the country, and the jungle fever prevalent after 15th September, render the river unnavigable for purposes of commerce. Captain Fenwick himself, owing to the fatigue and exposure, was nearly carried off in Bombay from consequent severe remittent fever.

The most that could be concluded of the Nerbudda from Captain Fenwick's proceedings was that it might be passed between August and December, but not between February and June; and it is evident it must, at best, depend on the rise of the river, and the quantity of water, as Captain Fenwick's obstructions at the same spots were more serious than Captain Evans's when the river was full. This applies likewise to the level portion beyond Tullukwara, in which, after September, the journey is more tedious, and several rapids are exposed by the cessation of the rains. The freshes have also to be watched: in fine, there would appear to be great uncertainty, as well as extreme difficulty. Captain Fenwick's trip is perhaps more confirmatory of Sir R. Hamilton's first conclusions in respect to Captain Evans's voyage. Sir R. Hamilton says:—

“As to the means for making the Nerbudda available to commerce, I have great doubts whether the returns would compensate for the outlay. The formation of roadways to transport the freight of boats at the different falls may be undertaken; but they alone will not suffice: there must be a line of boats to carry on the goods which may be sent, and an unity of working, which only could be secured by a river company, or by a Government establishment.”

The expense incurred cannot be considered a criterion for the future; for in all undertakings, experiments and first operations are necessarily large, and not thrown away or costly in the main, if they lead to the exposure, removal, or remedy of defects, whether these relate to the enhancing of the value of the products, the reduction of cost of conveyance by improvement of roads, or otherwise. A perusal of these experiments in contrast with Mr. Berkley's and Colonel Kennedy's Reports will certainly incline the present generation of thinkers and readers to the opinion that the 500 miles of distance interposed between the sea and the Nerbudda Valley (proper) may be more expeditiously, more safely and permanently, also more advantageously and less expensively overcome by rail, than by the most approved system of river navigation that could be contemplated.

The papers which follow are not of less importance than those on the navigation of the Nerbudda. They are the Reports of Mr. Jacob on the Mineral Resources of the Valley, and of Mr. Berkley and Colonel Kennedy on the Rail. In accordance with his instructions, the first proceeded to the iron mines of Kautkot, Chandgur, Tendukheira, Ponassa, and Makeraban. They are all

hematites, viz. hydrated peroxides of iron, ochreous, superficial, and very rich in ore, which they yield pure at a loss of about 80 per cent. by the Native method of extraction, with charcoal fuel, and no flux, or previous roasting. The present prices are 4s. 6d. per ton for ore, and 9s. 6d. for charcoal at Kautkot, and which may be had for 5s. 6d. at Tendukheira. Coal is, however, within reach, and not many miles distant, for 9 annas, and iron quite good enough for casting at 1s. 3d. per ton at Makeraban, on the Towah. At Burwya the ore was friable and silicious, but exceedingly pure at Chandgur, Kautkot, and Tendukheira : at the former, the Nerbudda cuts through a large vein, and every stream brings down quantities. At Ponassa, a good flux (dolomite), and fire-clay, are found seventeen miles from the coal, which it was estimated may be had for 4 annas per ton ; and also surface iron of quality adapted for casting. Mr. Jacob recommends it therefore as the site of their mines, which would require neither shafts nor pumps, and he calculates they may be worked under £5 per ton for ore.

The coal seams at Sonádeh Mr. Jacob thinks indicate rich mines below. Their general extent is probably fifteen by seven miles. The Benar field, on the Sceta Rewa river, has three seams—of eight feet, three feet six inches, and six feet three inches ; separated by laminated shale, four inches thick ; the available seam being nine feet nine inches,—highly inclined, owing to trachyte veins. He characterises it as a bituminous lignite, with no sulphur, well adapted for iron-smelting, and little residue. At Beethári Ghat, the Nerbudda cuts a pyritous coal seam at an angle of 80°, overlaid by dolomite. The result of this geological report, necessarily cursory and superficial, denotes an inexhaustible supply of iron, with all the incidental advantages of flux and fuel in close proximity, cheap, and easy of access.

Next in succession are the Reports of Colonel Kennedy and Mr. Berkley on the Line of Rail through the Nerbudda Valley. Colonel Kennedy, on finding the Great Indian Peninsula Railway Company already in the field, seems to have adopted the general direction of their line, the excellence and selection of which is undisputed : the features of the country really do not admit of two distinct routes. The contemplated line, Mr. Berkley says, after crossing the Taptec, ascends the Satpoora range, the summit of which is only 390 feet above the level of the river, by a series of easy reverse curves. Its ascent is effected in a distance of twelve miles, without any work that calls for observation, and with various gradients, the worst of which is 1 in 100, of a length of a mile and three quarters, and descends by still lighter. They are more favourable than Mr. Berkley expected it was possible to obtain. The Nerbudda is crossed at Jhansee Ghat, about 500 miles from the mouth of the river, with a viaduct of 371 yards only, without any engineering difficulties, or expensive contingencies ; and between these extreme points, viz. Asseerghur and the Nerbudda, the course of the railroad runs through the essentially productive part of the valley, or upper basin of the Nerbudda, passing in the immediate neighbourhood of the large towns, and the iron and coal mines, the

importance of which may be truly said not to be over-estimated, if it is called to remembrance that the permanent way of the rail, some 450 miles in length, has to be obtained from England, at a cost of at least £3,000 per mile (the high prices of which Mr. Berkley, at paragraph 67, states is the serious and undue impediment to the cheap construction of railways through the interior of India), and that the several demands for coal in Bombay come to nearly 50,000 tons per annum, which is imported from England, at a cost of at least ten lakhs of rupees. Through the entire line, the requisite material for earth-works, stone and lime for building, teak of large scantling, and other good woods, abound, and are procurable at short distances, and can be conveyed down the Nerbudda and tributary streams. Were it not for the river crossings, Mr. Berkley affirms the cost of this portion of the railway would reach the very lowest limit, the curves and gradients being particularly level and straight, the labour low, and engineering difficulties few. In short, the character of it is unexceptionable, and presents the utmost facility for construction. Mr. Berkley's Report, in these and all other respects, is so ably drawn up, and is so clear and intelligible a narration of not only the immediately professional view of the undertaking, but of the commercial and industrial value of opening this line (so far as his statistics enable a decision to be arrived at), that the short reference to his conclusions does but little justice to his summary, which is worth attentive study. It but renders patent the very pertinent remark of the *Friend of India* on railroads in the interior, "that the country, which is now nearly closed, the resources which are now sealed, and the intercourse which is now nearly buried, would all be benefitted, to the manifest advantage of Government and of commerce, as well as of social happiness and comfort," by their speedy sanction and completion.

For similar reasons, limiting the observations on Colonel Kennedy's Report to that portion of it which has reference to the object of these papers, the resources of the Nerbudda Valley, it would seem that the Colonel's primary object is to open a communication from the Khandeish branch of his central line to the iron and coal-fields of the Nerbudda,—which he considers it indispensable and essential to work at once,—to establish foundries, sink shafts, and make it available for the large and extensive branches which his project embraces. Convinced from Mr. Jacob's Report of the nature and amount of the resources, Colonel Kennedy expects to effect a saving of £1,500 per mile on his lines of rail; and to carry the principle further, he recommends to Government the substitution of iron bridges, pile piers, and other improvements on iron structure, which may be placed within attainment, to the exclusion of the more expensive masonry viaducts and bridges contemplated. He would import iron for the first 100 miles from England, and make an iron way from his foundry at Ponassa to his junction. Although, as Colonel Kennedy states, it is impossible to overrate the beneficial consequences that the Nerbudda mineral districts are calculated to produce in the industrial development of India, if properly dealt with; yet, considering that Surat, the nearest point to

his direct line, is a distance of 250 miles from the nearest foundry, and that a line of some nature, whether of tram and temporary character, or of permanent way, must be completed, before a ton of machinery could be carried up, or of iron be brought along it, there would seem better grounds for concurrence in Mr. Berkley's reasoning, "that active and successful operations in these enterprises will be found to depend more upon the completion of railway communication between Bombay and the Nerbudda Valley than the railway does upon a local supply of iron and coal." Bearing in mind the immense extent of the contemplated railroads to the north of the Nerbudda (and through Malwa more directly still to the north), there is little fear that the most ample occupation will be found for all the coal that can be raised, and iron made, for the next century, after the completion of the line to the Nerbudda Valley. If iron and coal are the chief aim of Colonel Kennedy in entering into the Nerbudda Valley, he is likely to meet them much closer at hand at Baug, which is scarcely thirty miles from Rajpore, a point on the north bank of the Nerbudda on his Baroda and Culpee extension line; and it is questionable (and here thrown out as a surmise, irrespective of engineering reasons and difficulties) whether the Nerbudda Valley and Colonel Kennedy's own central line would not be more benefitted by taking one to the coveted and desirable mines at Ponassa, along the north bank of the Nerbudda, from Oodeypore or Rajpore through British Nimar, than from Surat *via* Khandeish. Of one fact there is little assurance required—that one line, whether to the Nerbudda Valley, proceeding over the Deccan ranges, or skirting them *via* Surat, will not suffice to supply the wants of traffic that will be generated; and that the line sketched out *via* Bhopawur, Indore, and Bhilsa to Culpee, will be of equal if not greater value, and not even in imagination less important than that of the Taptee and Nerbudda Valley, drawing, as it must, the rich opium and grain districts of Malwa, and the upper portions of the Saugor and Nerbudda Territories, which are above the Ghats. There certainly exist grounds for the belief that most ample and remunerative returns will be obtained by the speedy opening and connection of Western India with the North-Western Provinces, through the unoccupied and fertile districts of Malwa and Rajpootana, which, though not as rich in cotton, are as favoured in other respects as any parts of Khandeish. It would be matter of surprise if the Governor General of India, himself the best authority and soundest thinker on these topics, should limit the operations of both companies to the same districts, or permit them to run in close contact and competition, while so vast a territory and line of country remains unoccupied, and invites their labours.

SELECTION FROM THE RECORDS OF THE BOMBAY GOVERNMENT,
1838-1851,

RELATING TO

THE NERBUDDA RIVER,

AND THE

MINERAL DISTRICTS OF THE NERBUDDA VALLEY;

TO WHICH ARE APPENDED,

EXTRACTS FROM REPORTS BY MR. J. J. BERKLEY, CHIEF RESIDENT
ENGINEER, BOMBAY, OF THE GREAT INDIAN PENINSULA RAIL-
WAY COMPANY; AND BY LIEUTENANT COLONEL J. P. KENNEDY,
MANAGING DIRECTOR AND ENGINEER-IN-CHIEF, OF THE BOM-
BAY, BARODA, AND CENTRAL INDIA RAILWAY COMPANY; WITH
ACCOMPANIMENTS TO THE LATTER REPORT.

NERBUDDA RIVER.

AND THE

MINERAL RESOURCES OF THE NERBUDDA VALLEY.

From Major J. R. OUSELEY, Pol. Agent and Commr., Hooshungabad,
To Major FELIX, Priv. Secy. to the Hon. James Farish, Governor of Bombay.

Dated the 27th November 1838.

SIR,

As required in your letter dated 14th September last, I have the honour to send 200 Bunjaras' bullocks, laden with coal. About 10 tons are carried on 100 bullocks. Great difficulty is just now experienced in getting Bunjaras to go in that direction at all; and the only terms they would accept were for each bullock Co.'s Rs. 8 the trip. This may occupy a month and a half; so that it is not very high after all. I have paid Rs. 800 here, and the remainder (Rs. 800) they will receive at Bombay. The experiment is expensive; but at the same time, I trust it may prove to be one that will ultimately convince Government that the value of their internal resources is as unbounded as the most sanguine could imagine, and ensuring independence of all mischances in the regular supply of fuel for the home communication by steamers. Anthracite coal has been found at home to be infinitely superior to every other kind for steam purposes: the fields of it here are literally inexhaustible. When I add that wood for charcoal, and iron ore, abound at the same spot, it may not be visionary to hope that a line of railway direct from Bombay to Mirzapore, *viâ* Boorhanpoor, may, in the course of a few years, be determined on: the advantages are as incalculable as they are obvious; Mirzapoor and Bombay at each terminus of the line could then be supplied to any amount, and for little expense.

I have desired the Bunjaras to be particularly careful to avoid flinging down the loads, as they do grain; for it would soon reduce all the coal to powder. I have the honour to send a bit of the coal, taken at random from one of the loads, as a specimen: it evidently improves the deeper it is dug into.

I have, &c.

(Signed) J. R. OUSELEY, Major,
Political Agent.

Hooshungabad, Office P. A. and C., the 27th November 1838.

To the MINT ENGINEER.

SIR,

I am directed by the Honorable the Governor in Council to request that you will receive charge of a quantity of coal sent by Major Ouseley from Hooshungabad, and that you will subject it to all the tests that may be best calculated to ascertain its quality and adaptation for the service, and report the result for the information of Government.

I have, &c.

(Signed) E. M. WOOD, Lieutenant Colonel,

24th January 1839.

Secretary to Government.

From Captain H. B. TURNER, Mint Engineer, Bombay,

To Lieut. Col. E. M. WOOD, Secy. to Govt., Marine Dept., Bombay.

Dated the 12th June 1839.

SIR,

I have the honour to report, for the information of Government, the result of a trial made yesterday of the *Indus*, iron boat, with a view of ascertaining her speed, and the performance of her engines; and, in compliance with the instructions conveyed in your letter of the 24th January last, of proving the comparative value, as a fuel for steam-boat engines, of the coal obtained from Major Ouseley, at Hooshungabad.

The vessel was sent out in pieces from Mr. John Laird's factory, and the engines supplied by Mr. Maudsley; they are of 60 collective horse-power, having 32-inch cylinders, 3-feet stroke, with wheels of 14 feet 6 inches diameter.

The vessel had on board 28 tons of coal, being sufficient fuel for four days of twenty-four hours each; her draft of water abaft was 3 feet 6 inches; and although the marks on her stem showed a greater draft forward, I am disposed to believe she was on an even keel.

We started from opposite the southern buoy of the middle ground at 10h. 30m. A. M., being a few minutes before high-water, and stood up the harbour in the direction of Tanna, the engines making 26 revolutions. We reached Chenanee bunder, about one mile below Tanna, and 22 miles from the point from which we started, at 12h. 40m., having gone at the rate of 10.15 miles per hour. At first starting, the tide, though slack, was in our favour; but after rounding the point of the Neat's Tongue it turned, and, if anything, was against us the rest of the way; deducting, therefore, half a mile an hour for the tide, it leaves her speed through the water 9.65 miles per hour.

On arriving off Chenanee, the engines were stopped for a few minutes to screw down the packings, and to fix the indicator, and again started towards Bombay at 1 P. M. At 3 P. M. we reached the point we had started from, had a strong tide in our favour; but the wind and swell, which had increased since we started, were directly against us,—sufficient, indeed, leaving Trombay, to reduce the speed of the engines two revolutions.

The vessel is fitted with two boilers, also made by Mr. Maudsley, of precisely equal capacity, and perfectly independent of each other, having one fire-place in each. The same quantity of water was filled into each boiler, and the fire-place of the one laid with good fresh Glasgow coal, and of the other with Hooshungabad coal.

Steam was up, or commenced escaping at the safety-valve in the boiler, with the Hooshungabad coal, in 1 hour 30 minutes after lighting the fires; the quantity of coal expended, including what was used in laying the fire, being 2 cwt. 3 qrs. 8 lbs., or 10.53 lbs. per horse-power.

In the boiler with the Glasgow coal,—the fires having been lighted in both at the same time,—the steam was not up till 15 minutes after it commenced blowing off in the other boiler, and the quantity of coal expended was 5 cwt. 20 lbs., or 19.33 lbs. per horse-power; thus showing the Hooshungabad coal 83 per cent. better than the Glasgow, and raising the steam in 15 minutes less time.

From Bombay to Tanna I continued to use the Glasgow coal in one boiler, and the Hooshungabad in the other, keeping the steam up in both to the same degree of elasticity: in the 2 hours and 10 minutes, 6 cwt. 1 qr. 18 lbs. of the Glasgow coal was expended, being equal to 11 cwt. and 4 lbs. per horse-power per hour; while 5 cwt. 1 qr. 10 lbs. only of the Hooshungabad coal was used, being 9.20 lbs. per horse-power per hour.

In returning to Bombay, for the first hour, while in smooth water in the river, the engines making $26\frac{1}{2}$ revolutions, Hooshungabad coal was used in both boilers, and 6 cwt. 27 lbs., or 11.65 lbs. per horse-power, was consumed.

During the next hour, both boilers were fed with Glasgow coal; and notwithstanding the speed of the engines, and consequently the quantity of steam required, was reduced, as before stated, by the strong head wind, 7 cwt. 1 qr. and 6 lbs. was expended, being at the rate of 13.96 lbs. per horse-power.

The expenditure of coal in both cases per horse-power will be considered large: but it must be taken into consideration that the engines are of small size; that neither the boiler, steam-chest, nor steam-pipe have as yet been covered with any non-conducting substance; and that from their being quite new, and a good deal rusted on the voyage out, the surfaces have not yet become steam-tight.

The Hooshungabad coal produces very little ash, but, like the Burdwan coal, forms a good deal of scoria or clinker on the fire-bars.

It ought also to be remarked, that from the distance this coal has been brought overland (500 mile-), it has been broken into very small pieces,—indeed a good deal of it is literally dust: in using it, however, the dust was not separated, the expenditure above shown being the exact weight of the coal expended, dust and all.

I have, &c.

(Signed) H. B. TURNER,

Bombay. Mint Engineer's Office, 12th June 1839.

Mint Engineer.

From the GOVERNMENT OF BOMBAY,
To the Honorable the COURT OF DIRECTORS FOR AFFAIRS OF
THE HONORABLE EAST INDIA COMPANY, London.

HONORABLE SIRs,

Dated Bombay, 10th July 1839.

We have the honour to transmit the accompanying copy of a letter from the Mint Engineer, dated 12th ultimo, reporting upon the performance of the new iron steam-boat, the *Indus*, and also on the quality of some coal which we lately procured from Hooshungabad.

The performance of the *Indus* appears to us to be most satisfactory; but the most interesting part of the Report relates to the Hooshungabad coal, which is stated to have got up the steam with about half the quantity of fuel, and in less time than with Scotch coal.

As we have no doubt that the Right Honorable the Governor General will concur with this Government in the very great importance of measures being adopted for obtaining further supplies of the superior coal found at Hooshungabad, we have requested his Lordship to authorise such course as may, in his opinion, be best calculated to give the fullest effect to the measure of bringing this coal into extensive use.

We have, &c.

(Signed) JAMES FARISH,

Bombay Castle, 10th July 1839.

„ G. W. ANDERSON.

Reply from the Honorable the COURT OF DIRECTORS to the foregoing Despatch.

Dated 12th August 1840.

*Letter dated 10th July,
No. 36 of 1839.*

Forwarding Reports on the performance of the new iron steam-boat the *Indus*, and on the qualities of some coal, forwarded from Hooshungabad, as applicable to steam purposes.

These Reports are interesting, and in general satisfactory.

On the occasion when the Hooshungabad coal was tried as a fuel on board the *Indus* steamer, it appears that the fire-place of one of the boilers was laid with good fresh Glasgow coal, and that of the other with Hooshungabad coal, which, having been brought overland a distance of 500 miles, was very much broken, and included a good deal of dust. Steam was raised by the last-named coal 15 minutes earlier, and with smaller consumption of fuel, than by the Scotch coal; and the Hooshungabad coal was manifestly superior in keeping up steam during the whole trial, although not in equal proportion; in consequence of which, we observe that you have authorised the prosecution of further experiments. We think it also particularly desirable that the coal from Hooshungabad be tried against the best samples of Llangennech and Lewis Cwm Vale as well as against the West Hartley coal lately consigned to you, in order to ascertain their comparative merits as steam fuel; and we shall be

glad to learn the results. The Reports of the Committee for investigating the coal and mineral resources of India, which reached us through the Government of Bengal, represent the coal discovered by Major Ouseley near Chikaly, in the district of Hooshungabad, and elsewhere on the banks of the Nerbudda, to be of excellent quality, and inexhaustible quantity; but the distance of the beds of coal from the sea coast, and the natural difficulties presented by a portion of the intervening country, rendering the carriage of the coal to Bombay very tedious, must make it expensive, and, we fear, operate as a serious impediment to its being brought into extensive use as a steam fuel.

From Mr. J. H. CRAWFORD, Accountant General, Bombay,
To Lieut. Col. E. M. WOOD, Secy. to Govt., Marine Dept., Bombay.

Dated the 16th December 1839.

SIR,

I have had the honour to receive your letter of the 15th ultimo, No. 1707, requesting my opinion and report on the points noticed below, in order that it may be ascertained whether it is practicable to supply this Presidency with coal from the mines which are stated to abound in the Hooshungabad district.

1st.—The probable amount of coal consumed at Bombay per annum, in steam navigation.

2nd.—The expense incurred in providing the coal in question in round numbers.

3rd.—The price per ton, or, if possible, per maund of 80 lbs., in Bombay.

2. I request you will have the goodness to acquaint the Honorable the Governor in Council, in reply, that I find, on communicating with the Superintendent of the Indian Navy, by whose professional experience I have been desirous of correcting my own calculations on the first point, that the quantity of coal required for the use of the Bombay Presidency, in keeping up the steam-packet communication with England by the Red Sea, *the supplies to Suez and Aden included*, cannot be estimated at less than 10,000 tons per annum; but that we have not been able to form any estimate at present of the further quantity that may be required for general purposes when the steam-frigates and other steam-vessels, in progress of completion for service, unconnected with the steam-packet employment, shall be added to the strength of the steam establishment of this Government.

3. In respect to the 2nd point I may state, that taking the cost of the coal

Prime cost of coal per ton at Llanelly 11s., at 2s. per rupee	Rs. 5 8 0
Freight	19 8 10
Landing charges at Bombay in the fair season	0 4 0
Total per ton..	Rs. 25 4 10

free on board at Llanelly at 11s. per ton, which appears to be the rate contracted for by the Honorable the Court of Directors in England; freight at Rs. 19-8-10, as deduced from the statement of freight transmitted to Government in my letter No. 44 to your address, of the 14th June last; and boat-hire at 4 annas per ton in the fair season (and 10

annas in the south-west monsoon), according to a memorandum furnished me by the Commissary General on the 25th ultimo, we shall have Rs. 25-4-10 as the cost of a ton of Llanelly coal alongside the wharf at Bombay.

4. In regard to the 3rd point, I venture to believe that the new Indian maund of 40 seers, equal to 82½ lbs. avoirdupois, is the maund intended to be referred to by Government, as there is not any maund of exactly 80 lbs. avoirdupois in use in India that I am aware of; and in this belief I may add, that as the English ton of 20 cwt., or 2,240 lbs. avoirdupois, contains 27.222 maunds, it follows that a maund of Llanelly coal stands Government in 14 annas and 10 pies, or say in round numbers 15 annas per maund in Bombay, *hannalluge not included*, this last item having been omitted as unnecessary in the scale of comparison between Llanelly and Hooshungabad coal, since that charge from the wharf to the warehouse must be incurred in both cases, and will be the same in each.

I have, &c.

Bombay Castle,
Accountant Genl.'s Office, 16th Dec. 1839.

(Signed) J. H. CRAWFORD,
Accountant General.

From the SECRETARY TO GOVERNMENT, MARINE DEPT., Bombay,

To W. HORE, Esq., Assist. Commr. to the Saugor and Nerbudda Territory.

Dated the 24th January 1840.

SIR,

I am directed by the Honorable the Governor in Council to transmit to you the accompanying copies of the letters which have been received by this Government, in reply to calls, made with the view to elicit information as to whether it is practicable to supply this Presidency with coal from the mines which are stated to abound in the Hooshungabad districts.

2. As there appears to be much uncertainty about the means and cost of conveyance by the river to Broach, the Honorable the Governor in Council is desirous that it should be tested by a consignment of fifty or a hundred tons. The Sub-Collector of Broach will be put in communication with you, for the purpose of making the best arrangements in your power for the conveyance of the coal as far as may depend upon you, and that officer will be directed to co-operate with you in the arrangements that you may make.

3. To what extent it might be advisable to take advantage of the full state of the river after the rains, will be for your consideration; but on this point I am directed to observe, that the coal would be very much deteriorated if it were exposed to the wet. The Governor in Council wishes, however, to leave you entirely unshackled as to the time and manner of sending the experimental consignment down the river, requiring only that all departments that can assist shall do so to the utmost.

I have, &c.

Bombay Castle, 24th Jan. 1840.

(Signed) E. M. Woods, Secy. to Govt.

From the MILITARY BOARD, Bombay,

To Colonel the Hon. SIR GEORGE ARTHUR, Bart., K.C.H.,
Governor and President in Council.

Dated the 18th July 1844.

HONORABLE SIR,

We have the honour to acknowledge the receipt of Secretary Lieutenant Colonel Melvill's letter No. 821, of the 2nd instant, relative to the coal in the districts on the Nerbudda,—requesting us to take a full review of the subject, and suggest such measures as may be requisite to elucidate or explain it; but as we have not yet had the advantage of the information possessed by the local authorities with whom we have been directed to correspond, we can only observe, that if it be designed to reap the advantages of the mineral resources in the districts alluded to by Major Ouseley, the most important point for consideration appears to be the means of transport.

We are of opinion that the coal could not be profitably brought to Bombay except by means of a line of railroad, or by the Nerbudda river. A survey of the Nerbudda was ordered in October 1841; but in consequence of the officers appointed to the duty being necessitated to proceed on field service, its prosecution was relinquished.

From a plan of the river compiled in 1840, which we beg to submit, there appear to be serious obstructions to its navigation; but these might probably be avoided by means of carriage along the banks of the river where the obstructions exist.

With respect to a railroad, we are not aware of any obstacle to the construction of a railroad between the Presidency and Hooshungabad or Jubbulpore; but such an undertaking, to be worth the expense, involves considerations of the general traffic of that line of country, of which we possess no means of informing ourselves.

No coal, of a sufficiently good quality to work, exists in the Bombay Presidency; that of Kutch proved a failure.

We have, &c.

(Signed) D. BARR, Major Général,
Military Auditor General.

„ G. JERVIS, Lt. Col. Comdt.,
Chief Engineer.

„ F. LESTER, Lieut. Colonel,
Member, Military Board.

Bombay, Military Board Office, 18th July 1844.

From Capt. SIR ROBERT OLIVER, R. N., Superintendent, Indian Navy,
To the Hon. GEORGE RUSSELL CLERK, President and Governor in Council.

Dated the 17th June 1847..

HONORABLE SIR,

In forwarding the result of an experiment upon a sample of coal from the Nerbudda, I also append a chemical analysis by Professor Giraud, very kindly performed at my request: there is also a contrasted extract upon a small quantity of coal from the Indus, obtained some few years back.

The apparatus used in the Factory is but an imperfect one,—a small cylindrical boiler, subject from its position to change of atmosphere and draft of funnel, from strength or lightness of the wind.

With all the apparent discrepancies, there is no doubt but this coal is a valuable acquisition, and the more so if the result prove as favourable when used in large furnaces and large quantities, which experience only can determine.

I have, &c.

(Signed) ROBERT OLIVER, Captain R. N.,
Superintendent, Indian Navy.

From Professor GIRAUD, M.D.,

To Sir R. OLIVER, R. N., Superintendent of the Indian Navy.

Dated the 12th June 1847.

SIR,

I have the honour to forward the following results of my examination of the Nerbudda coal you sent me for analysis. It yields in 1000 parts—

Solid carbon	381.97
Gases	353.73
Incombustible ashes	264.3

1000.

This composition affords so unfavourable an estimate of the coal, that I was induced to make several repetitions of the analysis; but as these all gave the same results, with only a fractional difference, they may be relied on as correct.

On comparing the above with the composition of British coal, and with that from the Attock which I examined three years ago, it will be found to differ from them in two important respects—1st, in its small proportion of solid carbon, on which the heating power of coals mainly depends; and 2nd, in the large amount of its incombustible ashes, which constitute its greatest defect.

I have, &c.

(Signed) HERBERT GIRAUD, M.D.,
Professor of Chemistry, Grant Medical College.

Grant Medical College, 12th June 1847.

REPORT BY COMMITTEE APPOINTED TO TEST IN THE STEAM FACTORY, BOMBAY DOCKYARD, SPECIMENS OF THE NERBUDDA COAL.

Experimental Trial of Government Standard Europe Coal.

Time in getting up steam ..	..	..	..	..	60 m.
Coal consumed in that period ..	..	..	..	..	56 lbs.
Time in evaporating 32 gallons of water ..	..	..	..	..	30 m.
Coal consumed in that period ..	..	..	..	..	32 lbs.

Experimental Trial of Coal said to have been sent from the Nerbudda.

First Trial.

Time in getting up steam ..	..	..	..	..	56 m.
Coal consumed in that period ..	..	..	..	..	77 lbs.
Time in evaporating 37 gallons of water ..	..	..	..	..	30 m.
Coal consumed in that period ..	..	..	..	..	34 lbs.

Second Trial.

Time in getting up steam ..	..	..	..	..	36 m.
Coal consumed in that period ..	..	..	..	..	77 lbs.
Time in evaporating 32 gallons of water ..	..	..	..	..	30 m.
Coal consumed in that period ..	..	..	..	..	26 lbs.

Third Experimental Test of the Nerbudda Coal.

Time in getting up steam ..	..	..	..	..	39 m.
Coal consumed in that period	{	per weight ..	..	..	66 lbs.
		per measurement ..	..	..	2,597 cub. ins.
In one-half hour's subsequent steaming, the quantity of					
water evaporated was ..	..	..	..	..	28 gals.
With an expenditure of coal	{	in weight ..	..	..	28 lbs.
		by measurement ..	..	..	1,039 cub. ins.

At the close of the trial the following residue remained, viz :—

Below the bars	{ per weight		..	..	11 lbs.
	{ per measurement		..	..	825 cub. ins.
Above the bars	{ per weight		..	..	17 lbs.
	{ per measurement		..	..	1,021 cub. ins.

Experimental Test of best Government Coal.

Time in getting up steam ..	..	..	..	..	38 m.
Coal consumed in that period	{	per weight ..	..	..	82 lbs.
		per measurement ..	..	..	3,043 cub. ins.
In one-half hour's subsequent steaming, the water evaporated was..					
					33 gals.
With an expenditure of coal	{	in weight..	..	..	23 lbs.
		by measurement ..	..	..	822 cub. ins.

At the close of the trial the following residue remained, viz :—

Below the bars	{ in weight	..	..	..	18 lbs.
	{ by measurement	..	..	..	1,039 cub. ins.
Above the bars	{ in weight	..	..	..	9½ lbs.
	{ by measurement	..	..	..	920 cub. ins.

(Signed) A. CURSETJEE,
Chief Engr. and Insp. of Mach.

„ D. MACLAREN,
Asst. Chief Engr. & Insp. of Mach.

„ J. INGLIS,
Foreman of the Vice-erecting Shop.

Steam Factory, 16th June 1847.

NOTE BY COMMANDER LYNCH.

I attended these experiments, and am of opinion, that the Nerbudda coal is a very good coal for general steam purposes. It gets up steam quickly, and burns with a clear flame, leaving scarcely any clinker on the bars, and not more than a fair proportion of ash. It is not equal to the best Government coal, but not much inferior for steam purposes.

(Signed) H. B. LYNCH, Commander I. N.

16th June 1847.

From R. N. C. HAMILTON, Esq., Resident at Indore,

To J. G. LUMSDEN, Esq., Secretary to Government, Bombay.

Dated Camp Sonadeh, 1st February 1848.

SIR,

I have the honour to report, that having reached the vicinity where coal was said to exist, in company with Mr. Johnstone, I examined the bed of the stream in which it was said to be, and found it in three separate places.

2. Enclosed I have the honour to submit a copy of my instructions to Mr. Johnstone, Lieutenant Evans, and Lieutenant Keatinge, and to add that I shall, as soon as I am in possession of sufficient information, report further for the information of His Honor in Council.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

Indore Residency, Camp Sonadeh, 1st February 1848.

**INSTRUCTIONS ALLUDED TO IN THE FOREGOING LETTER, ISSUED
BY THE RESIDENT AT INDORE FOR THE GUIDANCE OF MR.
JOHNSTONE.**

Dated Camp Sonadeh, 1st February 1848.

Having now reached the place where coal exists, and visited the spot with you to-day, I think the following instructions may be useful, to enable you to carry out the intention and object of your deputation at my request from Bombay:—

1st.—You will examine the coal-field at this place, with a view to ascertaining the extent of the coal basin, the dip, the superficial limits of the outcrop, whether limestone, iron, or any other object of interest that may be in connection with it; and such other points of information which your experience may suggest.

2nd.—You will endeavour to form an estimate of the expense at which the coal may be brought to the surface; by what process,—whether any machines will be required; and you will state what means, in your opinion, will be best suited to dig the coal, and bring it to the mouth of the pit.

3rd.—You will adopt measures to have 500 maunds of coal dug at once, and brought to the surface at a convenient site for loading: funds will be supplied you; but you must be careful in seeing every payment made, and every claim of workmen satisfied.

Having done what may be necessary to give effect to the above instructions, you will then proceed to examine for coal at other points, bearing in mind that the nearer the coal is found to the Nerbudda, the more easily and cheaply it can be transported to Bombay; and for this reason I would direct your research towards Asceerghur, and if practicable to Beejaghur near Sindwah, Bawurguy near Burwy, and so to the Hurun Pall, where the Satpoora range joins the Nerbudda.

You had better keep a journal, and daily insert whatever you may do. This rough journal can afterwards be transcribed at Indore, where you will come on having completed the inquiries.

If time will admit, you should examine the iron mine near Chandgur Bauglee; and the copper near Kautkot, on the right bank of the Nerbudda, from specimens of the ore; and searching for coal in its vicinity, should there be any indication of its existence.

Wherever you may find coal, you should dig a certain quantity, and store it, to form a depôt; making inquiries in each case as to the dip, extent of basin, &c., and noting the particulars with accuracy in your journal. Such coal-field should bear the name of the nearest large village, or the name of the Purguna. You will intimate to Lieutenant Keatinge where the several depôts may be formed, and he will adopt measures to transport the coal to the river.

To enable you to pay work-people, I make over to you a sum of Rs. 300, and have made arrangements for your being supplied with money on your receipt through the local officers marginally noted, who will attend you.

Lieutenant Evans, Nimar, Deputy Commissioner at Baitool; Deputy Commissioner at Hooshtungabad.

You will keep me informed of your proceedings, by sending me weekly a prospective statement, showing where you may be likely to be found in the event of my having anything to communicate to you.

I hope every arrangement has been made to facilitate your inquiries: if you should need any further assistance, or find the Native establishments not alert or attentive, you will at once address Captain Spence, Lieutenant Ternan at Baitool, or Lieutenant Evans, as the case may be, and I have no doubt you will meet with every attention.

I need not point out to you the importance of the inquiries entrusted to you: I am satisfied your zeal and ambition will prompt you to every exertion; and I shall have the greatest pleasure in bringing your services to the notice of the Government of Bombay, and of Sir Robert Oliver. All your correspondence regarding coal, or the object of your mission, must pass through me.

(Signed) R. N. C. HAMILTON,
Resident.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To Lieutenant H. L. EVANS, Political Assistant in Nimar.

Dated Camp Sonaulch, 1st February 1848

SIR,

I have the honour to forward to you copies of the following papers:—

Letter of Instructions, No. 173, of this date, addressed to Lieutenant Keatinge; and Instructions addressed to Mr. A. Johnstone, No. 174.

2. You will see that to Mr. Johnstone is assigned the duty of searching for, and examining into the coal-fields between this place and where the Satpoora hills meet the Nerbudda at the Hurun Pall; and that to Lieutenant Keatinge is entrusted the bringing the coal from the pit to Dharee on the Nerbudda, where it is to be stored, and a depot formed.

3. Your late trip down the Nerbudda will enable you to make arrangements, by collecting boats of all sizes, &c. previous to the opening of the river, so as to facilitate the transport of the coal to Tullukwara, or the place where sea-going craft can come from Broach.

4. It occurs to me, that the coal may be moved from Dharee before the rains to the Hurun Pall rapids, by contract with the river boatmen at Oonkar, Mundlaisir, and Mhysir; and I request your attention to this point.

5. At some of the rapids or falls, it may be necessary to have blocks, ropes, &c. &c., and other appliances stored, to prevent delay, and the expense of supplying every boat with separate gear; and you will take this subject into immediate consideration, with a view to having all prepared by the time the coal may be moved to Broach.

6. As the services of an efficient Superintendent under your orders will be required for this duty, and as there is a call for such assistance in seeing the coal properly laden and dispatched from the pits, you are authorised to engage, as a temporary arrangement, Mr. Fenwick, of whose fitness you are satisfied, on a monthly salary of Rs. 100,—his pay to commence from the date he may reach Hindia, where instructions for his future guidance will await him.

7. All expenses and charges on account of this experiment, whether incurred by Mr. Johnstone, or by Lieutenant Keatinge, or by yourself, must be met by advances from your treasury; and the accounts, headed "Coal Experiment," must be separately kept in your office, and transmitted to me for adjustment.

8. It will be necessary for you to keep your communication open with Mr. Johnstone whilst occupied in his inquiries; and that the local officers under the hills, and all persons, be required to afford him every assistance, and to attend without demur to all requisitions he may make on them.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To Lieutenant KEATINGE, Nimar.

Dated Camp Sonadeh, 1st February 1848.

SIR,

It having been determined that you should be associated with Mr. A. Johnstone in place of Lieutenant Evans, whose services cannot be dispensed with in Nimar, I request you will join him as soon as you have completed the examination of the Nerbudda between Hindia and the Dharee falls. I beg your attention to the following observations:—

2. By a perusal of the annexed copy of instructions delivered to Mr. Johnstone, you will see that the search for coal, and the inquiries connected with the coal, form his especial duties; whilst those entrusted to you will be the transport of the coal from the pit to Dharee, on the Nerbudda, where a depôt is to be formed.

3. You will therefore, as soon as possible, collect carriage for the transport of coal from hence to Hooshungabad, on the Nerbudda,—the nearest road being at present through the Kaislah Ghat.

4. You will therefore move to Hooshungabad whenever you think it desirable; and you will collect as many boats of all sizes as may be procurable for hire, and proceed with them to Dharee, taking in coal as you pass. Should it be found nearer to send the coal to any village on the bank, you must make the best arrangements you can (as to hire) with the boatmen; and you will endeavour to make the cost eventually as small as possible, though at first you may be forced to pay high to induce people to venture on a new speculation: however, I am given to understand that the Bunjaras will convey it from this at 4 annas a maund to the river.

5. It will depend upon the means of transport that you may procure how long it will take you to convey the coal to Dharee; and you will yourself remain where you may think your services can be most advantageously employed.

6. You will have the goodness to draw on Mundlaisir for any money you may require; and you will be careful to keep your accounts distinct and clear, that the exact cost of the experiment, as far as you are concerned, may readily be settled.

7. Of course you will keep in constant communication with Mr. Johnstone when he moves on to prosecute his search, so that you may be able to arrange for the transport of coal from any other places he may raise it.

8. It will be proper to keep distinct the coal of each separate pit.

9. Having collected all the coal at the depôt at Dharee, it will be moved, on the opening of the river, towards Broach; for which arrangements must be made by you in communication with Lieutenant Evans, who has been separately addressed by me, and who may possibly be able to get the coal moved to Chikulda, or to the Hurun Pall, by contract, as soon as you report a sufficient quantity collected at Dharee.

10. As there will be a great need of efficient supervision, I have directed Mr. Fenwick to proceed as soon as possible to this place, to act under orders he will receive from you; and you will employ him in the raising and transport of the coal.

11. I need not urge you to afford Mr. Johnstone any assistance in your power towards carrying out the objects of his inquiry; and I am satisfied he will receive from you that cordial co-operation so essential to carry out with success this most interesting and important experiment.

12. A copy of my letter No. 172, of this date, to Lieutenant Evans, is enclosed for your information.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

Indore Residency, Camp Sonadeh, 1st February 1848.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To the SECRETARY TO GOVERNMENT, Bombay.

Dated Indore Residency, 26th February 1848.

* SIR,

By my despatch No. 171, dated 1st instant, the Honorable the Governor in Council was informed that Mr. Johnstone had joined my camp, and of my intention to proceed direct to the locality near which coal had been found.

On the 2nd February I reached Bhodur, a Jageer village in the Baitool district, situated in the range of hills between the Nerbudda and Taptee. The road from Sindwah Ghat to Nundwara, the foot of the hills, by the route given below, was good and easy for every description of carriage :—

Sindwah to Jeelwand	16½	miles.
Woon.....	18½	„
Khurgaon	11	„
Bhikungong	10	„
Sirwul	12½	„
Khundwa	14½	„
Bhangheer	11½	„
Chainpore.....	16½	„
Charnah	19½	„
Messenging	15½	„
Timbornee.....	17	„
Seonee	18½	„
Nundwara.....	8	„
Bhodur.....	16	„
Sonadeh coal-field	10½	„

The pass from Nundwara was hardly practicable for wheel carriages of any description, but there was nothing to prevent a road of easy slope being constructed at the two or three points where alone any impediment occurred.

From Bhodur to Sonadeh, 10½ miles, the path was through a continuous tree jungle, level, and good. Carts are not used by any of the Goond or Koorkoo villages, but they might be introduced; and as the soil is good, could travel at all seasons.

Sonadeh contains seven huts, and belongs to Toonia Patel, who pays Rs. 5 a year to the Jagerdar of Bhodur, within whose limits it is situated.

About half a mile from the village is the nulla called Bowree, a mountain torrent in the rains; the bed was deep sand, with pools of water here and there. In the left bank, under a layer of sandstone (where the stream had scoured away the sand), coal was seen cropping out. Here it was that Colonel Ouseley had discovered it; and not far from this spot, higher up, Mr. Conybeare had excavated the coal sent by me last year to Bombay, the experimental trial of which was sent to me with your despatch No. 961, dated 17th July last.

In communication with Mr. Johnstone, I determined that he should at once commence work. Toonia Patel and his two sons, with three more men, were all we could collect in the neighbourhood: these, with some Bildars belonging to my camp (being supplied with tools I had brought), soon cleared away the sand, and laid bare the seam. On excavating, we found that the coal seam was 20 inches thick; that the angle was $7\frac{1}{2}^{\circ}$, and lay between two layers of shale, each 4 inches thick, embedded in sandstone: the upper stratum was coarse-grained, and soft, 30 feet to the surface of the land; the lower was coarse-grained, and hard.

The coal we raised burnt well, without refuse, and was pronounced by Mr. Johnstone to be equal to the main coal of Scotland, and perfectly adapted for use in Bombay.

This result determined me to raise at least 20 tons (from 500 to 600 maunds), and I set to collect workmen for this purpose. Meanwhile Mr. Johnstone proceeded to survey the neighbourhood, so as to form an opinion of the probable extent of the basin.

I think I am safe in stating that the basin extends throughout the space enclosed by the surrounding hills, and may be estimated at 15 miles by 20; but as I shall hereafter furnish a detailed report on this branch of the subject, I propose confining myself for the present to noticing what has been done, and what may be assumed as the cost of raising and transporting the coal under present circumstances.

As soon as I had put everything in train, I was compelled to leave Mr. Johnstone, being obliged to return to Indore. I had intended leaving Mr. Keatinge with Mr. Johnstone; but that officer's services were not available, and after his examination of the Nerbudda I directed him to return to his proper duties in Nimar.

Whilst with Mr. Johnstone, very material assistance was rendered to me by Ensign Edwards, of the 49th N. I., Adjutant of the Malwa Contingent, who commanded my escort, and by Mr. Sub-Assistant Surgeon Tranter; indeed, without the aid rendered by these two officers, our difficulties would have been much greater, as the presence of an European was found to be absolutely necessary whilst the mining was going on, the Natives being ignorant of the mode of working the seam, and the nature of the work giving cause to apprehend slips; indeed one occurred, which at first was alarming,—one man was buried under a large rock, which came down suddenly whilst we were at the pit, and but for our presence, most probably the delay in extricating the sufferer would have proved fatal; as it was, by our joint exertions he was got out, and immediately attended to by Dr. Tranter, who found severe contusions on the legs, and bruises on the body; and by applying the proper remedies I am happy to say the man has quite recovered.

The panic thus created amongst the Natives nearly put a stop to the work: three only appeared the next morning,—the Patel and his sons. However,

Mr. Johnstone's personal exertions, and our encouragement, restored confidence, and workmen were after a few days as abundant as ever.

It being impossible for me to leave Ensign Edwards or Dr. Tranter, and having no one else available, I was constrained to send for Captain Fenwick, late in the Nizam's service, in whose knowledge of the country, of the Natives, and of the customs of the merchants, I had full confidence; and I offered to him a salary of Rs. 100 per mensem, to cover his expenses.

Captain Fenwick at once came from Indore, and joined Mr. Johnstone; and, under my instructions, upon him devolved the arrangements for transporting the coal from the pit.

Mr. Johnstone has reported that 20 tons have been raised; and Captain Fenwick that he has engaged with Bunjaras at Seonee, with whom I had commenced negotiations, to convey that amount to Dharee, on the Nerbudda, for 5 Nagpore rupees per manee of 12 maunds of 40 seers each. By this the coal will cost on the bank of the Nerbudda at Dharee something under 7 annas per maund.

From Dharee to the Hurun Pall it can be conveyed by water, before the rainy season, at a cost of 2 annas a maund, making the total cost to the Hurun Pall 9 annas a maund.

Thence to Tullukwara, or the point at which one of the Government lighters from Bombay can come, the cost may be 2 annas, or even 3 annas more per maund; so that for 12 annas a maund, or Rs. 21 a ton, the Nerbudda coal is now available to the Government.

I shall be obliged by instructions whether I shall raise any more coal at the pit, and what quantity. Work at the pit can be carried on till June next, and the coal brought to Dharee, on the Nerbudda: after that date, or the setting in of the rains, there may be difficulty; but as it will be impossible to work the coal from the bed of the river, I requested Mr. Johnstone to sink a common shaft, and he informs me that he has commenced on one, but details have not yet reached me.

Mr. Johnstone has from the first evinced a zeal, intelligence, and personal activity most creditable to him, and without which I could not have carried out the inquiries now reported. To Captain Fenwick, also, my acknowledgments are due, for the successful manner in which he has carried out my views in making the contracts with the Bunjaras.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

Indore Residency, 26th February 1848.

From R. N. C. HAMILTON, Esq., Resident at Indore,

* To the SECRETARY TO GOVERNMENT, Bombay.

Dated Indore Residency, 2nd March 1848.

SIR,

In continuation of my despatch No. 300, dated 26th ultimo, I have the honour to forward, for submission to the Honorable the Governor in Council, the annexed copy of a letter from Mr. A. Johnstone, replying to queries addressed by me to him regarding the coal at Sonadeh.

I have, &c.

(Signed) R. N. C. HAMILTON,

Indore Residency, 2nd March 1848.

Resident.

From Mr. A. JOHNSTONE,

To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Camp Sonadeh, 25th February 1848.

SIR,

In answer to your letter of the 13th ultimo, I have the honour to submit to you the result of my inquiries on the Sonadeh coal. I have seen it in several places in the Bohra river, and had a sketch, marking the places where it is exposed, and shall give you the measurements I have taken at three of the best of the places. The first I shall notice is the place where Colonel Ouseley raised some coal eight or nine years ago,—on the sketch it is first, marked A: sandstone 12 feet; shale 11 inches; coal 6 inches; shale 11 inches; coal 7 inches; shale 4 inches. B, is a place where I had opened a few days ago; the measurements—sandstone 20 feet; clay 3 inches; loose shale 11 inches; coal 6 inches; shale, very hard, and mixed with sand, 4 inches; coal 14 inches; shale 8 inches. C, is the mine we have been raising the coal from for the present experiment: sandstone 30 feet; shale 4 inches; coal 18 inches; shale 4 inches. All the places at which I have seen coal in the Bohra river, I have marked with cross lines in the sketch.

2. *The Quality of the Coal.*—It seems to me a very good coal for marine purposes, and in that I am borne out by the Coal Committee's Report on the same coal in the Bombay Dockyard, where they had every means of ascertaining its real value. Its specific gravity is 1.392, as taken from the mine.

3. The coal lies in a northerly direction, and at an angle of from 8° to 10°,—a very convenient angle to work.

4. *The Thickness of the Seam.*—You will see, from the dimensions given, that it varies in thickness from 6 to 19 inches.

5. *The best Mode for Working*, it seems to me, is to have a number of shafts put down, and from the bottom work from all the four sides, driving a roadway 4 feet high by $3\frac{1}{2}$ feet wide, and subdivide it into rooms or galleries. However, that will be much better determined on after seeing the coal at the bottom of the shafts, and the appearance of the roof, and whether there is likely to be any difficulty in ventilating the mine, or any appearance of explosive gas.

6. *The Transmission of the Coal to Bombay*.—In this lies the greatest difficulty: at present the Bunjaras are rather indifferent about taking the coal at all; but a few trips would cure them I suppose. Mr. Fenwick has made an arrangement to have the coal taken from here to Dharee for 5 Nagpore rupees per manee, or at the rate of Rs. 13 per ton. Carts seem to me better adapted for the work, and there are only about three miles of the road by Sewnee impracticable for carts: an outlay of four or five thousand rupees would make a good road all the way, when the price might be brought down, perhaps to one-half even, by the Bunjaras. The price we pay now ought not to be taken as a fixed rate, if the coal were worked on a large scale, perhaps 2,000 tons per month. The Bunjaras would have a return cargo of grain and other necessities for the workmen; one bullock-cart, with four bullocks, would carry a ton, and make two trips per month, and at the rate of Rs. 4 per bullock would be Rs. 8 per ton. The expense from Dharee to Bombay must be answered after the first cargo goes down the river.

7. *The Expense of Digging and Carrying away the Coal*.—At present it is 8 annas or 9 annas per ton. One man can dig 13 maunds per day with ease, and one man is sufficient to carry away the coal from two; and they are paid at the rate of 2 annas per day,—that is, 6 annas for 26 maunds of 80 lbs. each.

8. *The Extent of the Coal Basin*.—This is a question that will require some time before any correct idea can be formed. If I may judge from the outward appearance of the country, it is very probable the coal extends all over the basin between the hills, which is about 20 miles by 14. I have been round the greater part of it, but have not as yet seen coal in any other river than the Bohra. I would here recommend the propriety of putting down a number of bores, not only to ascertain the extent of the seam of coal we have just been working, but to ascertain the strata to be found below; and if the sites are carefully selected, a very correct idea may be formed of the whole basin. There is a well at Dharee at present nearly full of water,—in the month of May it is nearly dry: I have directed Mr. Fenwick to examine it, and see if there is any appearance of coal. It is about 50 feet deep. There is another at Bohra, also nearly full of water: that also I have requested him to see when it gets dry, and bring away a specimen of the rocks passed through. I attach a good deal of importance to the putting down of some bores, as recommended above: upon that will depend, in a great measure, the value of that basin. You will see by the dimensions I

have given that we shall find the coal very unequal in thickness, like all other surface coal.

9. I am not prepared at present to give anything like an estimate of the machinery necessary: that will depend a great deal on the quantity of water. I should think, for the present experiment, that one pair of bullocks, and the common frame used for drawing water from the wells, would suit all requirements: the expense of putting down shafts will be better ascertained after we get the present one finished, which is going on rapidly. Should anything else appear to me worthy of being brought to your notice, I shall not fail to write you before leaving this. There is one great difficulty we labour under at present, that is the price of the grain, which would be overcome if the works were carried on, on a large scale. It sells here about 30 per cent. higher than at Sewnee, although the distance is only about 30 miles, and causes a great deal of discontent among the workmen.

I have, &c.

Camp Sonadeh, 25th February 1848.

(Signed) A. JOHNSTONE.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To the SECRETARY TO GOVERNMENT, Bombay.

SIR,

Dated 3rd March 1848.

I have the honour to submit a Report from Mr. A. Johnstone, in which he notices having found another coal-field, at Mardanpore, the seam of which is 2 feet 4 inches. The angle is great (20°), but the coal Mr. Johnstone considers superior. It is situated still further from the plain of the Valley of the Nerbudda, and from Dharee, the place of embarkation, than Sonadeh.

I now beg to submit an estimate of the probable cost of working one shaft, and the probable out-turn; and to solicit the orders of the Honorable the Governor in Council, whether operations shall be continued or suspended.

The cost of working one shaft for twelve months will be Rs. 6,364; the out-turn is estimated at 10,920 tons of coal; which would give a rate of about $9\frac{1}{2}$ annas per ton, or about an anna for 3 maunds.

It will be impossible to depend upon the Bunjaras for the transport when the working is large: in the first place, daily loading and unloading would break the coal; and in the second, it would be found cheaper to cut the road where bad, and to have carts.

The road need only be made an easy fair-weather track, such as a four-bullock cart with a ton of coal could travel.

I have traversed the country, and speak confidently,—that there is nothing to prevent carts being employed, except just in the height of the rains, from ~~Sonadeh~~ ^{eh} to Dharee, on the Nerbudda, where, I am of opinion, the coal should

be stored, and floated down the river as far as possible, which in the rains may be, below Tullukwara, to where the sea-going craft may be able to come up, and up to April as far as the Hurun Pall, from whence carts, I apprehend, would be found the cheapest carriage.

An estimate of the cost of carriage must at best be guess-work, until actual experiment affords certain data.

A four-bullock cart, at the rate of Rs. 4 a month per bullock, would be Rs. 16; and this for two trips per mensem would make the carriage of the coal Rs. 8 per ton, and the total cost on the river bank Rs. 8-9-4 per ton; to add for the carriage to Hurun Pall Rs. 6 per ton, and Rs. 5 thence to the sea, will make the coal Rs. 20 a ton; but it must be borne in mind that the carts and boats will make something in the return trips, and that when an organized system of communication is established, and a return hire obtained, the cost of the coal will be reduced.

I shall, therefore, be obliged by instructions for my future guidance.

If operations are carried on, Mr. A. Johnstone must be directed to remain at Sonadeh, and his salary determined. He will require two assistants,—one, Captain Fenwick, on a salary of Rs. 200 a month; another on Rs. 200, to superintend the depôts at Dharee and Hurun Pall,—with less than this number the work could not be properly superintended; and a Native establishment of three Karkoons on Rs. 20 each (Rs. 60), and ten Chuprasees on Rs. 40,—in all Rs. 100,—will also be required. A Native Doctor should be added.

I need not point out the advantages which will result from the port of Bombay being independent of foreign supply for its coal, or the profit to the country by the expenditure of capital in the very centre of a dense, uninhabited, though fertile tract. Sooner or later a railway must extend from Bombay to Delhi: its first portion will be to the Nerbudda, which must be crossed, I think, at the Dharee falls, the locality and bed of the river being peculiarly favourable at that place.

The entire bed of the river is basalt: the stream, after passing over near a mile of this hard surface, precipitates itself down a chasm cut in the basalt bed about 40 feet, as I have endeavoured to describe in an accompanying sketch; then forces itself round the hard basalt through a passage about 50 yards wide, the sides of which are precipitous basalt;—over this a bridge could be thrown with ease. Hence, by the Bauglee Ghat, the ascent to the table-land of Malwa can, I think, be attained at a favourable gradient, as far, at least, as my examination enabled me to judge.

The finest iron in this part of the country, not very inferior to the black main of Scotland, abounds on the right bank of the Nerbudda, in the vicinity of Dharee, at Chandgur, Kautkot, and along the lower hills. Specimens of this I procured on the spot; and I will take an early opportunity of sending them with those of the coal, shale, &c., to the Asiatic Society's Museum in Bombay.

I have just had a Report from Mr. Fenwick, by which His Honor in Council will be able to appreciate some of the difficulties we have to overcome in getting the Natives to take up a new trade, or assist in carrying out the experiment.

I have, &c.
(Signed) R. N. C. HAMILTON,
Resident.

From Mr. A. JOHNSTONE,
To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Camp Mardanpore, 28th February 1848.

SIR,

Just as I was starting from Sonadeh for this place, the day before yesterday at 3 p. m., the Bunjaras arrived (300). There is plenty of coal to load the whole of them. I expect by the time I get over to Sonadeh, this morning, that the coal will be off. I have seen the coal here: it lies at a very great angle (20°), and in the direction of north-west; the thickness is 2 feet 4 inches, and its specific gravity is 1.229. It seems to me superior to the Sonadeh coal, if I may judge from its appearance. On my way to this place—about two miles from Bohra, and in the bed of the river Sookce, about 100 yards from its junction with the Towah river—I saw some more coal, but very thin,—only 3 inches thick, and not regular. I received the account of the boring tools being on their way to Sewnee. I shall send off for them to be sent on to Sonadeh, and mark a couple of places for Mr. Fenwick to put down bores. I should like to have remained here, to have seen a fair commencement made; but that I cannot do, seeing the extent of country you wish me to visit before the month of May. However, I shall explain to Mr. Fenwick how to proceed with the boring operations. I have made the shaft at Sonadeh large enough to admit of a pair of pumps, in the event of the water being too much for bullock-power. There is a small high-pressure engine lying in store in the Bombay Dockyard: it was made for the purpose of instructing the apprentice boys; and I think the Government gave permission for the experiment to be tried, but not to exceed Rs. 800; so, if it was required here, they could not charge more for it than that sum. It is about 10 horse-power, and about 2 tons in weight without the boiler, which would be another 3 or 4 tons. It has got pumping apparatus,—6-inch pumps, and 18-inch stroke,—made for Aden; but was rejected on account of their taking up 10 feet of room, when the well was only 2 feet diameter. However, we must first consider what a pair of good strong bullocks can do. I annex an estimate I have prepared of the probable expense of working one pit.

I remain, &c.

Camp Mardanpore, 28th February 1848.

(Signed) A. JOHNSTONE.

Estimate alluded to in the preceding Letter.

Bullock-power 5 cwt. raised 60lbs. per min.	100 miners, at Rs. 4 each per month	Rs. 4,800
60	10 men keeping the roads in repair below, at Rs. 4 each.	480
300	10 men for stowing away the coal at the top of the pit, Rs. 3 each	360
5 hours constant work.	2 Native overseers, at Rs. 10 each	210
20) 1,500	1 smith, at Rs. 8 per month..	96
75 tons total weight per day.	1 carpenter, at do. do. . .	96
Water 5,600 gals. - 25 tons, to be subtracted from 75, the remainder is	1 bellows-man, at Rs. 4 . .	48
50	2 bullocks, at Rs. 4 per month.	96
— 10 rubbish.	1 driver, at Rs. 4 per month.	48
40	Interest on Rs. 2,000 for tools, &c. at 5 per cent	100
100 men 8as. each 5	Total . .	Rs. 6,364
35 tons of coal per day.		
26 working days per month.		
210		
70		
910		
12		
10,920 tons of coal.		

I have calculated the shaft at 60 feet deep,—it may be 10 feet more or less; and the water, too, is a guess, I think, on the safe side: all the other items are sure calculations. This amount would, I think, be sufficient to work one pit; and the cost is rather more than 9 annas per ton. It would be necessary to have a European who understood coal working for a couple of years, to get the colliery properly set going. This calculation is after there is roadway for 100 men to work; the first six months, of course, the amount of 35 tons of coal per day could not be raised.

(Signed) A. JOHNSTONE.

From Captain R. H. FENWICK,

To R. N. C. HAMILTON, Esq., Resident, Indore.

Dated Sonadeh, 28th February 1848.

SIR,

In continuation of my letter of the 24th instant from Sewnee, I regret to have to acquaint you that the Bunjaras whom I had engaged at that place, and who arrived here the day before yesterday, on seeing the coal, at once

refused unconditionally to take it up, without any reference to the terms of their agreement; declaring that their bullocks would be destroyed by the pricking of the sharp points of the large pieces. Nevertheless, I had four sacks filled, in which not more than two pukka maunds could be stowed away; but when they were placed on the backs of the bullocks, two of them laid down, and all threw their loads down. It became apparent that, in the shape the sacks assumed when filled, the least thing would throw them off. However, imagining it to be the trick of the Bunjaras, I insisted on the performance of their engagement; and after an altercation of the whole day, towards the evening they consented to take about 300 maunds, with the view of loading their bullocks with less than 2 maunds each, when they started another impediment, that they would not, under any consideration, agree to unload in the manner I pointed out,—that is, by lifting the sacks from the backs of the cattle, and placing them carefully on the ground, so as to prevent the pieces of coal from breaking, turning almost into powder by being roughly thrown down, according to the usual practice with grain, cotton, &c. This objection on their part I have not been able to overcome, and the Naik has absented himself without intimation. The tone assumed by the Bunjaras induces me to believe that it will be difficult to induce them to carry the coal at all, at any rate so as to secure its delivery at Dharee in the state necessary to render it of any value. I have deemed it proper to lay the above before you, for your consideration and future orders. Should I, however, succeed in making the Bunjaras abide by their agreement, and secure the object desired, of placing the coal at Dharee in a proper condition, I shall at once take advantage of it, and address you promptly on the subject.

I am not prepared, from such information as I possess at present, to say whether it would be practicable to employ carts; but I fear not at a rate to bring the cost within the limits pointed out in your instructions. They could only be loaded at Nundwara, to which place pack-bullocks would have to be employed; and the difficulties and impediments abovementioned would thus far still exist. The hire of a four-bullock cart from Sewnee to Indore is 12 Nagpore rupees, and the load 20 pukka maunds. What it would be from hence to Nundwara I am unable to form an opinion just now. I beg leave respectfully to add here, that the want of a Hindee writer prevents my communicating with, and procuring assistance and information from, the Native authorities at Sewnee, Shahpoor, and other places.

The Bunjaras now here declared their intention of taking the route by Bordah and Sewnee, declining the one by Pophlia, Sungasun, and Hurda, decidedly.

As soon as I am enabled to come to a definite conclusion with the Bunjaras, I shall have the honour of addressing you again.

I have, &c.

(Signed) R. H. Fawcett.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To the SECRETARY TO GOVERNMENT, Bombay

SIR,

Dated Indore Residency, 10th March 1848

In continuation of my despatch No 345, dated 3rd instant, I have the honour to forward copy of a letter from Mr. Fenwick, dated 4th instant, reporting having persuaded the Bunjars to take the coal, and of another from Mr. Johnstone, dated 2nd instant, reporting having found a route practicable for carts, requiring but a trifling outlay to make it easy and good, also of a further letter dated 7th instant, from Mr. Fenwick, which has just reached me.

I have, &c

(Signed) R. N. C. HAMILTON,

Indore Residency, 10th March 1848

Resident

From Captain R. H. FENWICK,

To R. N. C. HAMILTON, Esq., Resident at Indore.

SIR,

Dated Sonadch. 4th March 1848

In continuation of my letter of the 28th ultimo, I have now the honour to report that the Bunjara Naks returned yesterday, and I have at last prevailed with them to take up the coal, which is now being packed in their sacks. I hope to be able to see them off to-morrow. What quantity they will be able to carry, they cannot themselves say at present. I shall not fail to write to you again on the subject in a day or two.

It is necessary I should acquaint you, that after consulting with Mr. Johnstone, who left this for Mukrai on the morning of the 1st instant, I resolved upon accompanying the Bunjara bullocks myself to Dhucc, taking with me the eleven Bildais and three Sungtushes now employed here, to ensure the careful loading and unloading of the sacks. The Bunjars could not be induced to move without my doing so. The lifting of the shaft will therefore be suspended till my return. We have gone down to 13 feet, and are now working in a bed of sandstone.

I have also the honour to acquaint you that Mr. Johnstone, on leaving this, placed in my hands an order from Captain Spence for Co's Rs. 300, on the Sewnee Tuhseel, which I doubt not will be duly realized.

In conclusion, I beg to inform you that I have now with me one of the Residency Chuprasses, two peons from Shahpooi, and the two village peons whom I entertained at Sewnee, at Rs. 4 a month each. The carpenter, blacksmith, and bellows-boy shall be left here to prepare timber for supporting the sides of the shaft to the sandstone foundation, which is at 9 feet from the surface.

I have, &c.

(Signed) R. H. FENWICK,

Sonadch. 4th March 1848.

From Mr. A. JOHNSTONE,

To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Camp Gowasing, 2nd March 1848.

SIR,

I have got good news for you (not that I have found a bed of coal, for I am now in the centre of basaltic rocks), but I have found a good *road* for the coal, where carts may go all the way to Sonadeh. I made notes of the road as I passed along, and I am of opinion that a good cart-road can be made for Rs. 500; in fact, the road is already made, with the exception of two ascents near Sonadeh, about 3 miles to the west;—at present there is only a footpath. The ascent is about 1 in 15, and 200 feet long. All the rest of the road is like a bowling ground,—a few furrows here and there, that would require to be filled up; and all along the road there are lots of small stones, varying from 2 inches to 6 inches diameter; so you might have a beautiful metal road very cheap. From Sonadeh to Peepliah is 14 miles (I think); from Peepliah to Sander about 6 miles,—this is the place where we joined the Baitool cart-road. From there to Gowasing is about 6 miles, and in that distance there are only two ascents of any importance. They seem about 1 in 18,—a very good angle for a cart-road, and in capital order. These ascents are opposite Sowhghur, which we passed on our right about half a mile. I sent the Shewpore Chuprasee with a note to Mr. Fenwick, advising him to come this way with the coal, it being a much better road, shorter than by Bardow, Nundwara, and Sewnee. There is plenty of water all along the road every couple of miles or so, and lots of grass. I wish you had gone by this way instead of that miserable road between Bardow and Nundwara. The only thing to be said against this route is the want of supplies,—nothing to be had but *grass* and *water*. I left Sonadeh at 6 A. M. on the morning of the 1st, and arrived at Membia, about a quarter of a mile past Peepliah, at 11 A. M. I had stopped a good many times on the road, and walked mostly all the way. Left Membia on the 2nd, at half-past five, and arrived here at 10 A. M. I shall make a short march to-morrow of 8 miles to a place called Kudassee, on the road to Hurda. From there I am told there is a good road to Mukrai, and provisions to be had. If we get this road opened, the rate of carriage will be much reduced, and we should be independent of these Bunjaras, who seem to be rather troublesome customers to deal with. They were still holding out when I left; but Mr. Fenwick had made up his mind to take his whole force, and proceed along with them, and let the shaft stand for a me.

I shall be at Mukrai the day after to-morrow, and shall write you from that place, if I should see anything worth bringing to your notice.

I have, &c.

(Signed) A. JOHNSTONE.

From Captain R. H. FENWICK,

To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Sonadeh, 7th March 1848.

SIR,

In continuation of my letter of the 4th instant, I have the honour to acquaint you that I leave this to-morrow morning with 462 maunds of coal on 226 bullocks, and hope to deliver it at Dharee in about 20 days, in the state it has been packed here. I propose taking with me eight Bildars only, and leaving here the Residency Chuprasee with three Sungturashes, three Bildars, and the artificers, to go on with the shaft. The Russid peon from Shahpoor remains here, the other I shall take with me as far as Hurda.

I shall have the honour of addressing you as I proceed, to keep you informed of my progress. I shall take the route recommended by yourself, and since examined by Mr. Johnstone, and found to be far preferable to the one by Sareeam and Nundwara, both as to the levelness of the road and convenience of water; but it is quite a desolate tract for more than 28 miles. I have however provided Russid for my party for that distance.

I am, &c.

(Signed) R. H. FENWICK.

MARINE.

From A. MALET, Esq., Chief Secy. to Govt., Bombay,

To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated 4th April 1848.

SIR,

I am directed to acknowledge the receipt of your letters Nos. 300, 334, 345, and 367, dated respectively 26th February, and 2nd, 3rd, and 10th ultimo, with their several enclosures, reporting the result of the investigations lately made in the coal-beds in the vicinity of the Nerbudda, and to convey to you the thanks of the Honorable the Governor in Council for the exertions you have made on this occasion, in a cause which, in its ultimate results, may be of vast importance, not only to the public works at this Presidency, but to the steam marine, and to the progress of railroads in Western India.

2. The Honorable the Governor in Council desires to afford to you all the aid in the power of the Government. At present its means are limited to the services of Mr. Johnstone, and pecuniary assistance.

3. The Governor in Council is pleased to allow Mr. Johnstone to remain to superintend the coal-mining operations, and requests that he may be permitted to accompany the first convoy of boats laden with coal to Broach.

Mr. Johnstone being a civil engineer, his skill in many ways will prove of use in rafting the coal down the Nerbudda, erecting cranes, &c. ; while perhaps his geological knowledge will lead to the discovery of mines nearer to the river than those now reported on.

4. It will be intimated to the Commander in Chief of the Indian Navy, that the Governor in Council trusts, that considering the nature of the service, he will not feel the want of Mr. Johnstone until the time when he may be expected here in charge of the first cargo of coal ever floated down the Nerbudda.

5. As the estimate of charges which you have submitted is based on speculation in a matter of which, as yet, very little is known beyond the existence of superior coal, the Honorable the Governor in Council is pleased to place at your disposal the sum of Rs. 10,000, to be expended as your daily increasing experience may dictate; and requests that you will be so good as to furnish an account of the outlay. His Honor in Council would simply urge economy, and the necessity of gradually feeling your way; seeking for other coal-beds nearer the river, lower down, and avoiding more than simple clearances for laden carts and cattle to pass over, for future discoveries may throw in the rear the present beds, and on the close of the season it will be easy in the calculations to make allowances for bad roads, &c.

6. I am to inform you, that there being no immediate want of coal in Bombay, you need not on that score hasten your operations; and to suggest (should your local experience and inquiries bear out the views of His Honor in Council) the formation of magazines on the river, floating the coal down according to its state from depôt to depôt, thus acquiring an accurate knowledge of the river in all its bearings and peculiarities.

7. The salary Mr. Johnstone may deserve, in addition to his fixed pay, the Honorable the Governor in Council is pleased to leave to you to decide; and trusts that it, and all other charges, will be defrayed from the Rs. 10,000 above sanctioned.

8. The Governor in Council instructs me to suggest to you, that it might be well now to consider the proprietorship of the soil where the coals are found, and the best means of leasing or otherwise obtaining a right to work the mines; and to request that you will be so good as to give some information on the tolls and customs which Chiefs on the banks can levy on the coal in transit; such statistics being necessary to enable this Government to lay the matter in a complete form before the Government of India.

I have, &c.

(Signed) A. MALET,
Chief Secretary.

Bombay Castle, 4th April 1848.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To the SECRETARY TO GOVERNMENT, Bombay.

SIR,

Dated Indore Residency, 31st March 1848.

I have the honour to report, for the information of the Honorable the Governor in Council, the arrival of the coal at Dharce on the Nerbudda, whence it will be sent by water as far as it is possible to float the boats at this season of the year. I expect, however, that they must be unloaded near the Hurun Pall, and the coal sent from thence to Mokree, or near to it, by carts, there being a good cart-road in that quarter.

From Mokree the coal can be conveyed by water to the place where a pattimar or other vessel of small draft may be sent from Bombay, for its conveyance.

If the *Suake*, or other small steamer, could be sent from Bombay, with orders to proceed up the Nerbudda as far as the depth of water would allow at this season, some certain information and facts as to the capability of navigating the lower course of the river would be obtained before the monsoon, which would serve as a guide in future despatches.

Having in my several Reports endeavoured to place all the facts before His Honor in Council, I beg to offer the following proposition, supposing it be intended to work the Nerbudda coal-fields with a view to supplying the Government demand at Bombay.

To work the coal mines, the following establishment will be necessary:—
A Superintendent. This must be a practical man, conversant with coal-mining, and the management of the workmen at the pit. The Government could not select a better or more fit person than Mr. A. Johnstone, who has proved, by his exertions, his qualification, and who has a zeal and an interest in the work. His salary should be Rs. 600 per mensem for two years certain, from 1st January 1849.

Mr. Johnstone should have under him two Apprentices, to be selected for their qualifications, and to receive each Rs. 50 a month.

This would be a sufficient establishment, efficient to superintend all works at the pit; and to this must be added workmen according to the subjoined scale for every shaft that might be sunk:—

100 Miners, at Rs. 4 each.....	Rs. 400
10 Bildars, at ditto	40
10 Men to stow coal	30
2 Native Overseers, at Rs. 10..	20
1 Smith.....	8
1 Carpenter	8
1 Bellows-man	4
2 Bullocks, hired	8
1 Driver	4

Total...Rs. 522

For the transport of the coal from Sonadeh to Dharee, Mr. Johnstone has found an easy and practicable cart-road, which being repaired after the rains, the coal could be brought cheaper and safely to Dharee.

For the superintendence of the transport department, there must be one superintendent, with two assistants.

The local costs of superintendence would then be Rs. 1,000 per mensem, viz :—

One Superintendent at	Rs. 600
Two Apprentices at Rs. 50	100
One Superintendent at	200
Two Assistants at Rs. 50	100

Total.. ..Rs. 1,000

Captain Fenwick would have the general charge of the transit department, and his two assistants be available for moving with despatches, or for being located at such places as experience may hereafter point out as requiring their presence.

It is for the Government to determine whether operations shall commence as soon after the rainy season as possible; and if so, to intimate the number of tons of coal that shall be raised: 20,000 tons could be raised and sent to Bombay next year, and a much larger quantity if the Government should direct. The cost of the coal at the pit may be estimated at 9 annas a ton, or Rs. 11,250 for 20,000 tons; the cost of carriage, as soon as there is a certainty in the employment, will fall considerably, and be still lower when the return trade is created, by which back hire for carriage will be saved; but even if a ton of coal were to cost the first season Rs. 20 in Bombay, the money would be well laid out, for by the existing means of supply the Government have to pay 32s. 6d. a ton, which at 2s. the rupee is Rs. 16-4-0; and this, it must be borne in mind, is in time of peace, when freight is low, and there is only ordinary sea risk to be covered.

I beg to state that I have given orders to continue sinking one shaft at Sonadeh, the expense being about Rs. 100 per mensem, and that I propose continuing this work until the setting in of the rains.

I do not yet despair of finding coal in the vicinity of Baug, in a locality on the right bank of the Nerbudda, no great distance from Hurun Pall. Should coal be there found in quantities, and of a good quality, half the expense of transport will be saved; but at present I am not able to speak with any certainty on the subject.

I beg to recommend Mr. A. Johnstone to the favourable notice of His Honor in Council. He is at present labouring under a severe attack of fever, brought on from exposure, but is convalescent. His exertions have been unwearied and incessant; so have those of Captain Fenwick, and who likewise, I hope, will be considered to have earned the approbation of Government.

I have, &c.

(Signed) R. N. C. HAMILTON,

Resident.

Indore Residency, 31st March 1848.

MARINE DEPARTMENT.

From A. MALET, Esq., Chief Secy. to Govt., Bombay,

To R. N. C. HAMILTON, Esq., Resident at Indore.

SIR,

Dated 26th April 1848.

I am directed to acknowledge the receipt of your letter No. 438, dated 31st ultimo, with its enclosure, and to observe, that my letter No. 544, of the 4th instant, anticipates in many respects the wishes expressed in your present communication.

2. The Commander in Chief of the Indian Navy will, I am to inform you, be requested to take measures to carry out the views expressed in the 3rd paragraph of your letter.

3. Mr. Johnstone having been sent from Europe for a specific purpose by the Honorable the Court of Directors, the Honorable the Governor in Council cannot, I am to state, without their permission, comply with your request to place Mr. Johnstone's services at your disposal for two years from the 1st January 1849; but Mr. Johnstone may for the present, and pending orders from the Home Government, remain in the Valley of the Nerbudda; and in the interim the strong recommendation of Government will be submitted to the Honorable Court, that the services of Mr. Johnstone may be devoted to the coal-mining undertaking for the period indicated.

4. Though undoubtedly the demand for Nerbudda coal by this Government may become urgent, the Honorable the Governor in Council would confine himself to simply asking you to feel your way; the more so as you anticipate finding coal at Baug, near the river at Hurun Pall. If coal from the Nerbudda can be had in abundance, and at a reasonable rate, the demand of Government for it will be almost unlimited. I am therefore to request that you will not relax in your operations in the present sites, while seeking for others lower down the river.

5. In supersession of the instructions contained in the 3rd paragraph of my letter above alluded to, the Honorable the Governor in Council directs me to request that you will pass the coal to Broach, or wherever the Commander in Chief of the Indian Navy can arrange for its reception, under the care of Captain Fenwick, who should thence return to the mines, or wherever you may desire, in order to raft more coal down, and become well acquainted with the navigation of the river; but this His Honor in Council would leave to your judgment.

6. The Honorable the Governor in Council requests that you will convey to Mr. Johnstone and Captain Fenwick the acknowledgments of Government for the services they have rendered.

I have, &c.

(Signed) A. MALET,
Chief Secretary.

Bombay Castle, 26th April 1848.

From the GOVERNMENT OF BOMBAY,

To the Honorable the COURT OF DIRECTORS FOR AFFAIRS OF
THE HONORABLE EAST INDIA COMPANY, London.

Dated Bombay, 25th April 1848.

HONORABLE SIRs,

We have the honour to forward, for the information of your Honorable Court, copies of our proceedings, relative to an experiment now being made to obtain coal from the Valley of the Nerbudda.

2. In December last, we beg to state, the Resident at Indore requested that the services of Mr. Johnstone, an Engineer of the Dockyard, might be placed at his disposal, to collect information relative to certain coal-fields found near the Nerbudda; and suggested that he might be allowed for his travelling expenses Rs. 10 per diem for four or six months.

3. The Superintendent Indian Navy having reported that the services of Mr. Johnstone could be spared, he was directed on the 22nd December to proceed to Indore, and the time of his detention at that place was left to the discretion of Mr. Hamilton, the Resident.

4. In the latter end of February, the Resident reported that he had visited a place called Sonadeh, in company with Mr. Johnstone, and discovered a seam of coal 20 inches thick, from which he had caused 20 tons to be raised, and hoped to be able to lay it down at Tullukwara, on the banks of the Nerbudda, whence it can reach the sea, at the rate of 12 annas a maund, or Rs. 21 a ton. He further stated, that to aid in the transport of the coal from the pit to the point of shipment, he had engaged the services of a Captain Fenwick, late of the Nizam's service, at an expense of Rs. 100 per mensem.

5. On the 3rd March, Mr. Hamilton communicated to us that he had found another coal-field, at Mardanpore, a place more distant from the point of shipment than Sonadeh, the seam of which is 2 feet 4 inches thick, and the coal superior to that found at the last-named place.

6. In soliciting to be informed whether the experiment should be continued, the Resident stated the estimated cost of working one shaft for twelve months would be Rs. 6,364, the out-turn of which might be estimated at 10,920 tons of coal, being at the rate of $9\frac{1}{2}$ annas per ton.

7. The Resident further observed, that except in the height of the monsoon, carts can be used all the way from Sonadeh to Dharee on the Nerbudda, where the coal can be stored, and in the rains floated down to the Hurun Pall, from whence it can be conveyed in carts to Tullukwara, or the place of shipment.

8. In regard to the portage, the Resident observed that the cart-hire to the bank of the river would be Rs. 8-9-4 per ton, the carriage from thence to Hurun Pall would be Rs. 6 per ton, and from thence to the sea Rs. 5 per ton, making the coal cost Rs. 20 per ton at the place of delivery; but this, he trusted, would be reduced when an organised system of communication is established, and return hire obtained for the carts.

9. If the operations are to be carried on, continued Mr. Hamilton, Mr. Johnstone must be directed to remain at Sonadeh, with two Assistants on Rs. 200 per mensem, and a Native establishment of three Karkoons on Rs. 20 each, and Chuprasees at Rs. 40 per mensem, with a Native Doctor.

10. On the receipt of this Report, in view to afford all the aid in our power, we allowed Mr. Johnstone to remain to superintend the coal-mining operations, and requested the Resident to permit him to accompany the first convoy of boats laden with coal to Broach. We placed the sum of Rs. 10,000 at the disposal of the Resident, to be expended by him as his experience might dictate; care being taken that all the expenses incident to the experiment were covered by that sum.

11. At the same time, we suggested to the Resident the formation of coal magazines on the banks of the river, as also the floating of the coal down, according to the state of the river, from depôt to depôt, by which an accurate knowledge of the river would be acquired. We also requested the Resident to consider the proprietorship of the soil where the coal was found, and the best means of leasing, or otherwise obtaining a right to working the mines; and to report as to the tolls and customs which Chiefs on the banks of the river could levy on the transit.

12. On the 31st March, the Resident informed us of the arrival of a batch of coal at Dharee on the Nerbudda, and requested that a small steamer might be sent, with orders to proceed up the Nerbudda as far as the depth of water would allow, by which certain information could be obtained as to the capability of navigating the lower course of the river before the monsoon.

13. The Resident also suggested, if it were intended to work the mines to supply the Government demand for coal, that Mr. Johnstone should be appointed Superintendent, with a salary of Rs. 600 per mensem for two years certain, from the 1st of January 1849; that he should have under him two Apprentices, on Rs. 50 each, to superintend the works at the pit; and for each shaft that might be sunk an establishment of miners, &c., the aggregate of whose pay should be Rs. 522 per month.

14. For the superintendence of the transport department, the Resident further proposed, that Captain Fenwick should be appointed Superintendent, on a salary of Rs. 200 per mensem, with two Assistants at Rs. 50 each, which will make the proposed local cost of superintendence Rs. 1,000 per month.

15. In concluding his Report, Mr. Hamilton stated that he had given orders to continue sinking one shaft at Sonadeh, at an expense of about Rs. 100 per month, and that he did not despair of finding coal near to Hurun Pall, in which case the expense of transport would be reduced one-half.

16. We have instructed the Commander in Chief of the Indian Navy to act in accordance with Mr. Hamilton's wishes, and we informed that gentleman, that Mr. Johnstone having been sent from Europe for a specific purpose by your Honorable Court, we could not without your permission comply with his request, but that pending the receipt of your Honorable Court's instructions,

Mr. Johnstone might remain in the Valley of the Nerbudda. We would now strongly recommend to your Honorable Court to allow Mr. Johnstone's services to be devoted to the coal-mining undertaking for the period indicated.

17. Though undoubtedly our demand for Nerbudda coal may become urgent, and almost unlimited, we have simply requested Mr. Hamilton to feel his way—the more so, as he anticipates finding coal at Baug; and that he would not relax in his operations in the present sites, while seeking for others lower down the river.

We have, &c.

(Signed) GEORGE CLERK.
WILLOUGHBY COTTON.
L. R. REID.
J. P. WILLOUGHBY.

Bombay Castle, 25th April 1848

From R. N. C. HAMILTON, Esq., Resident at Indore.

To the SECRETARY TO GOVERNMENT, Bombay.

Dated Indore Residency, 27th April 1848.

SIR,

I have the honour to state, for the information of the Honorable the Governor in Council, that the coal under charge of Captain Fenwick reached Chikulda, not far from the Hurun Pall, on the 20th, and that measures have been taken to store it there until the Nerbudda rises sufficiently to allow of laden boats going over the rapids below the Hurun Pall.

2. Chikulda is a post of the Malwa Bheel Corps, and a capital place for a dépôt: there is a bungalow there, occasionally occupied by Captain Wilkie, the Bheel Agent, when on duty at Burwanie, the godowns attached to which are available.

I have, &c.

(Signed) R. N. C. HAMILTON,
Indore Residency, 27th April 1848. Resident.

From Captain FENWICK, on Special Duty,

To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Chikulda, 24th April 1848.

SIR,

I received your letter of the 13th instant, on board at Akbarpoor, at 3 A. M. of the 17th, and also the official instructions. I beg you will accept my unfeigned thanks.

In mentioning to you now my arrival here at 2 p. m. on the 20th, I have to apologise for not apprising you of the same earlier. The only excuse I shall plead is, that I wished to look about me a little before I addressed you. On making inquiries, I learnt that there was not water enough in the river for laden boats to proceed to Hurun Pall; in consequence, I forthwith set about landing the coal, and storing it up in an empty godown attached to the bungalow at this place. The next day I was occupied in the above work, and by the evening 150 bags were housed. The 386 bags are now in the godown. Yesterday morning I left this in a small boat for Hurun Pall, to examine the state of the river, and that formidable obstacle, personally, and arrived at the Hurun Pall (a distance of about 15 miles) at 3 p. m. In several places in the river there were not more than 6 inches of water; and over some of the rocky passages, my boat, empty as it was (for I had no baggage at all with me, and only two Bildars, one Chuprasec, and one servant), had to be dragged, I may say almost lifted over; laden boats 30 feet by 5, with 2½ mances, cannot float freely in less than 18 inches of water. I passed the night at Dhurmai.

This morning at 6 o'clock I proceeded in the boat to examine the falls below the Pall,—these being the serious obstacles, and not the Pall itself. There are three rapids, with falls at their heads, at the distance of about a quarter of a mile from the Pall, and 100 yards from each other. The first has a fall of about 6 feet in 30; the second of 3 feet, and the third of 4 feet; and the force with which the water rushes against projecting pointed rocks on either hand of a channel not more than 10 or 12 feet wide, renders the passage extremely difficult and dangerous,—I might say impracticable in its present state. Empty boats may be let down and dragged up, as is the case at Sasradana; but this could not be done with laden ones at all. A channel to the left hand, falling into the principal one on the right, about one mile below the Pall, forming the island called the Hurun Pall Bheet (*Bheet* is an island), was pointed out to me, and examined; but it has no outlet at this time of the year.

From the above, and under many considerations, I think Chikulda should be the spot selected for a depôt.

I sailed from Hurun Pall on my return at 10 a. m., and came here at 3 p. m. with a brisk westerly breeze.

I beg to inform you that I lost no time, on my arrival here on the 20th, in making inquiries after carts to be hired to take the coal to Tullukwara, intending to dispatch two or three of them, agreeably to your directions. I am sorry to say there are no carts to be hired; but the authorities at Burwanie and Chikulda have offered to procure a couple for me. As soon as they are forthcoming I shall load them, and accompany the coal to Tullukwara and Broach, and then return by water, if it can be done; otherwise by the land route. Ragoba Balkishn, Native agent at Burwanie, produced Bunsara Naik to take the coal to Tullukwara, under engagement to pay Rs. 5 per bullock, or Rs. 2 per maund. I need not add that the Naik was at once dismissed.

I should have been quite ready and happy to have visited Baug, to look after coal, and superintend those occupied in searching under your instructions,—the heat of the weather would not have been in my way in the least; but I am promised the carts by to-morrow or the next day, and as this is the primary object just now, I shall postpone my trip to that place until my return, which, I trust, will be agreeably to your intentions.

In this place I cannot hesitate in coinciding with yourself in respect to the Sonadeh works. I do not think they could be carried on satisfactorily, except under European supervision; and the person employed should be, in my opinion, a professional and experienced engineer;—an intelligent Native, however, could in the mean time go on with the shafts to any depth, just as they do with some of their wells to 100 feet, and even more. I beg to submit for your information a copy of the Hindee letter which I sent to Huri Chuprasee from Mundlaisir, through Captain Spence. If you could conveniently send a cooley-load of good country gunpowder to Sonadeh, it would materially help in forwarding the sinking of the pit. I had some samples procured from Boodah; but it was very bad, and it quite escaped me to send for some from Hurda. The Sungturashes understand blasting rocks perfectly.

I have, &c.

(Signed) R. H. FENWICK.

24th April 1848.

P. S.—The Karkoon has just come in from Baug, and says he had not been able to trace anything of coal anywhere.

FROM R. N. C. HAMILTON, Esq., Resident at Indore,
To the SECRETARY TO GOVERNMENT, Bombay.

Dated Indore Residency, 3rd May 1848.

SIR,

I have the honour to forward, for submission to the Honorable the Governor in Council, copy of a Journal on the passage from Dhar to Hurun Pall, kept by Captain Fenwick, in charge of the boats laden with coal.

2. Captain Fenwick had proceeded from Chikulda, with two carts laden with 48 maunds of coal, towards Tullukwara, and has reported his arrival at Ali Rajpooor on the 30th, and his expectation to reach Tullukwara on or about the 6th instant.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

Indore Residency, 3rd May 1848.

CAPTAIN FENWICK'S JOURNAL,

Alluded to in the foregoing Letter from Mr. HAMILTON.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1848 April 5th	..	Dharee.....	The boats being laden below the falls, were loosened from their moorings at sunrise on this date.
"	0½	Kingaycthur Tur Rapid.	Not difficult; there is a good sandy beach or landing-place here on the Ponassa side, but the jungle must be cut for five or six hundred yards from the road to the landing place.
"	3½	.....	Deep water the whole way; detached rocks in the river, but not dangerous. At Kumlatur, 5 feet water, with bad rocks in the channel. This is considered one of the worst places between Dharee and Mundhata; laden boats are let down with ropes, and empty ones dragged up.
"	1	.....	A narrow passage near the right bank; 6 feet water; detached covered rocks here and there, to be carefully avoided.
"	1	.....	Deep water; ruins of Kinchgur on the right bank, and junction of the Kumair river.
"	2	.....	A fine large, broad, deep pool all the way; rocks here and there.
"	..	Bukutgur.....	A rock in the middle of the river, the point just appearing above the water.
"	0¾	Chota Chokee Tur ..	4 feet water; not difficult channel; narrow passage; boats more than 6 feet beam could not pass without great danger; laden boats are let down with ropes, and empty ones dragged up.
"	0½	Kotekhara	A deserted village, on the left bank.
"	0¼	Sillance.....	Some rocks from above Kotekhara, hidden under water; to be carefully looked after.
	9¾	miles.....	By the Natives, 5 kos from Dharee.
April 6th	2	Byronpurun Tur	4 feet water; passage narrow, with three turnings; difficult for laden boats, which are let down with ropes, and empty ones hauled over through small outlets, with less than 1 foot of water.
"	..	Oukerjee.	
"	..	Mundhata.	
"	0½	Markundee Tur	4 feet water; narrow passage.
"	0¾	Kooharee Tur	Ditto ditto ditto.
"	0½	Bhallarow Tur.....	4 feet water; considered, and is, a very difficult one; extending for more than 100 yards; laden boats are carefully let down with ropes.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1848 April 6th	4 $\frac{1}{4}$	.. . . .	A very deep and broad pool all the way from Kothar (or Kothown) Ghat; some hidden rocks here and there, but not dangerous.
"	0 $\frac{1}{2}$	Choaria Tur	1 foot water; rocks in the channel; passage narrow, as usual; Chorar river joins here on the right bank.
"	0 $\frac{1}{4}$	Dheria Ghat.	
"	1 $\frac{1}{2}$	Kheeree Ghat.	
"	1	Mytak Kheiral	A Goojir village, on the right bank.
"	0 $\frac{1}{4}$	Katghura Tur	This rapid extends about 600 yards, and is studded with rocks; channel dangerous; between 1 and 5 feet water; laden boats let down with ropes. It must in the present state of the river be always difficult.
"	0 $\frac{1}{2}$	Binilay Sur	Temple and Dhurumsala, on the right bank.
"	0 $\frac{1}{2}$	Alhagaum	On the left bank, one Bunua; fowls procurable with trouble.
	12 $\frac{1}{4}$	miles	By the Natives, 6 kos from Sillanee.
			[N. B.—It appears to me, from the present state of the river between Dharee and Alhagaum, that boats of more than 6 feet beam, 30 or 35 feet in length, with 2 $\frac{1}{2}$ feet water sides, flat bottom; the bottom side planks of one log, scooped out thus [], would be the only ones that could be generally used. During the very height of the river in the monsoon, I think no boats could live at some of the places, where most dangerous whirlpools and high waves must be formed. The boatmen corroborate this opinion.]
April 8th } (Sunset). }	1	{ Seemala { Tokra	Right bank. } Just below Goromookh Dhurumsala. Left bank. }
"	1	Pithungur	Left bank.
"	..	Kupas Tur	Right bank.
"	0 $\frac{1}{4}$	Wakee Tur	5 feet water, 8 feet channel in the middle; numerous rocks on either side, with one foot water over them, the boat struck constantly.
"	1	{ Krian { Khygaum	Right bank. Left bank.
			[N. B.—The Rapid Wakeetur may be said to extend almost the whole way, channel in some places not more than 8 feet wide; in some parts very bad, only 1 foot water over the rocks, boats let down with ropes.
"	2	Sangoor	Right bank, Doinattee left bank; fine broad and deep pool.
"	1	Kawere	Left bank, broad deep pool the whole way; Sitokee and Kowreea right bank.
"	0 $\frac{1}{2}$	.. . . .	Rapids the whole way, very difficult and dangerous; in several places not more than 1 foot water over the rocks, with which the bed is studded.
"		Surkaree Tur	300 yards, 6 feet water, but dangerous from high waves; side rocks, and a fall of 3 feet.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
• 1848			
April 8th	..	Bakawan	Left bank.
"	0 $\frac{1}{4}$	Bhundwarra Tur....	5 feet water ; in one place very bad.
"	0 $\frac{1}{4}$	Mundana Ghat	Left bank ; Byeran right bank.
"	7 $\frac{3}{4}$	miles.	1 kos, according to Natives, from Alliagaum ; left at 11 A. M., arrived at sunset.
April 9th	..	.....	Left Mundana Ghat at sunrise, and arrived at Mundlairsir at 2 P. M.
"	0 $\frac{1}{4}$	Mundana Tur	Extending 300 yards ; channel in some places 8 feet wide ; 2 feet water.
"	1	Puthrar	Right bank ; Nagawan left bank.
"	1	Bhutyan	Left bank.
"	2	Soolgaum.....	Rocks all the way, and shallow in many places.
"	7 $\frac{3}{4}$	Mundlairsir	In many places very shallow, with rocks the whole way, but nowhere dangerous, though very tedious for laden boats ; studded also with low grass islands.
	12	miles.	
April 13th	..	.....	Evening at Myhesur.
"	1	.....	Shallow, with rocks.
"	3 or 2 $\frac{1}{2}$	.....	Fine deep pool, and broad.
	3 $\frac{1}{2}$	miles.	
April 15th	..	.....	Evening at Sasradana.
"	1	.....	Fine deep, broad pool.
"	..	Sasradana Falls and Rapids.	Extend for about 400 yards ; several falls of 3 and 4 feet ; channel 8 to 10 feet wide ; very bad rocks in the channel ; empty boats let down with ropes, with great difficulty.
	1	mile.	
April 16th	..	.....	Left Sasradana at 12 o'clock, and arrived at Akbarpoor at 5 P. M.
"	0 $\frac{1}{4}$	.....	Channel narrow and deep ; it would be very bad, I think, in the rains.
"	0 $\frac{1}{2}$	.. ..	Channel widening to 100 yards ; 18 inches water at one place ; boats let over.
"	0 $\frac{1}{2}$	.....	Broad pool ; not very deep.
"	.....	Zallimpore	Left bank.
"	0 $\frac{1}{4}$	.....	Deep and broad pool.
"	.....	Tutkottee	Right bank.
"	1	.. ..	Channel between rocky islands.
"	..	Sussungaum.	
"	..	Manwa Bhiltur ...	Channel 8 feet ; 4 feet fall ; 2 to 3 feet water ; very bad rocks on either hand. The boats were half emptied, and let down with ropes, and men holding on each side ; re-laden at the bottom of the rapid, 30 or 40 yards. The rapid winds along for 30

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1848 April 16th	2½	.....	or 40 yards, dashing against the rocks on either hand with great force. The boatmen behaved remarkably well, and the Bildars were very useful. •
"	..	Akbarpoor.	Shallows in a few places, but generally broad, open, and deep. •
	5	miles	3 kos by the Natives.
April 17th	..	.....	Left Akbarpoor at 9 A. M.; two of the boats changed, being old, and in a leaky state. Arrived at Kuthora near sunset.
"	..	Moogurree	Opposite to Akbarpoor.
"	1	Chota and Burra Rhul.	Right bank.
"	..	.....	River open, and deep all the way.
"	..	Akbarpoor Tur	50 yards; 15 inches water over the rocks; loose stones removed from the channel; rapid not dangerous, but tedious; boats handed over, or rather dragged along; 300 yards below there is a fort.
"	0½	A Rapid	18 inches water over the rocks; boats let down with ropes, about 50 yards.
"	0½	Peepulda	Right bank; a little above there are some rocky islands, but the channel is deep, and a pool the whole way from the last rapid.
"	0½	{ Chiklee	Left bank. } Many bad rocks; channel
"	3½	{ Nimbala	Right bank. } along the left bank.
"	1¼	.....	[Pencil memorandum lost on board.]
"	..	Adulpoor	Left bank. } Pool all the way from Chiklee.
"	..	Bhowa	Right bank. }
"	..	Bhownesur Tur	10 yards; 2 feet water over the rocks; 8 feet passage; channel winding, difficult, and dangerous; boats let down with ropes, with much trouble. This is one of the worst rapids in the river; at the bottom there is a fall of 3 feet, 7 feet passage; rocks on each hand, and a very bad and dangerous one in the middle, at the outlet, to be feared the most; this rock should be removed.
"	1	.....	Pool, deep water; rocks here and there.
"	..	Burreea	Left bank.
"	..	Kola Tur	100 yards; 2 feet water, and less; very bad and difficult at the end, from a rock in the middle of the channel.
"	0½	Kathoral	Left bank; pool all the way.
	8½	miles :	4 kos by the Natives.
1 April	..	.....	Left Kuthora at 6 A. M.; arrived at Kirmee at 5 P. M.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1848 April 18th	0½	Bilkesnore Pagoda ..	On the points of Dhurmapooree <i>Bheet</i> *(island), 2 miles long; right channel dry; left channel a broad pool, 6 feet deep; a rock in the middle, opposite the temple.
"	..	Dhurmapooree.....	Right bank.
"	..	Khooj Nuldee.	
"	0½	Khoojawan	Good pool; 6 feet water.
"	0½	Burreea	Left bank; good pool; jhow jungle along the right bank.
"	1½	Huthnawar	Left bank.
"	..	Binkote	Right bank; pool all the way to this.
"	..	Huthnawar Tur	Shallow rapids for 500 yards; boat dragged over the loose stones in several places.
"	..	Ghatmora Tur	Fall of 3 feet; 7 feet passage, and very bad; boats let down with ropes held on each bank; 4 feet water. This rapid is called Ghatmora Tur.
"	0½	Ghatmora Phal	5 feet water; 10 feet channel; a fall of 2 feet; boats lowered over with bamboo poles very dexterously.
"	0½	.....	Rocky islands and shallows.
"	..	Khutargaum	Right bank.
"	..	Nundgaum	Left bank.
"	..	Loolgaum	Right bank.
"	..	Buhamungaum	Left bank; river studded over with rocks and low islands; shallows all the way.
"	0½	Wishwanath Khira ..	Pool, with rocky islands.
"	..	.....	A narrow passage along the left bank; a small rapid with 4 feet water; rocks in the channel.
"	3	Mohapur	Right bank; a small pagoda; good pool the whole way, with some rocks here and there.
"	0½	Nuktia-ke-Phal Tur .	Not bad; 5 feet water; 10 feet channel.
"	0½	.....	Deep pool; Chiklee left bank.
"	0½	.....	Bad rocks; some under water, some just appearing above; 6 feet water, with a slight stream.
"	0½	.....	Man river joins here on the right bank; pool, with rocks here and there.
"	..	.....	A rapid, with rocks and loose stones; 2 feet water.
"	0½	Neemla Tur	Bad rocks in the channel; boats let down by the hand; 2 feet water; channel 8 feet.
"	0½	.....	Broad, deep pool.
"	..	Nulwaree	Left bank. Deb nudge joins here.
"	..	Ruthwa	Right bank.
"	1½	Lohaca	Left bank.
"	..	Mullungaum	Right bank; broad deep pool all the way.
"	1½	Koimce	Left bank.
"	..	Burdha Bazong	Right bank; deep and fine broad pool the whole way.
	12½	miles	6 kos according to the Natives.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1818 April 19th	..	...	Left Kurnee at 7 p. m. ; arrived at Lahana Burda at 5 p. m.
"	0 $\frac{1}{2}$	.....	Pool, with sunken rocks, and rocky islands.
"	0 $\frac{1}{2}$	.....	Ditto ditto ditto.
"	..	Ansupoora	Left bank.
"	..	Surwapoora	Right bank.
"	..	.....	River covered with sunken rocks, and rocky islands ; deep channel in some places, and 2 feet water in others ; intricate pas- sage, but not dangerous.
"	0 $\frac{1}{2}$	..	The same state of the river continues.
"	..	Chirasein Tur	Very winding and bad channel for 300 yards ; in one place 15 inches water ; boats led over by the hand.
"	..	.. ..	A bluff, high, isolated rock in the middle of the river, 150 yards below the rapid.
"	0 $\frac{1}{2}$	Macepoora	Left bank.
"	..	..	A small rapid.
"	..	Oordhuunia ..	Right bank.
"	..	..	Shallow continued.
"	..	.. ..	A very shallow part ; 9 inches water ; a channel had to be made, by removing the loose stones from the middle, and piling them up on each side for 150 yards, to deepen the stream to 15 inches, when the boats were dragged over. Half the day taken up in the above work.
"	0 $\frac{1}{2}$	.....	Another shallow, 6 inches water ; the stones removed as above, and a channel formed of 15 inches depth for 30 yards.
"	..	.. ..	At 300 yards another similar shallow, over- come in the same way.
"	..	.. ..	A bad rapid ; to be worked through very cautiously, though deep, the channel being very narrow, with rocks.
"	0 $\frac{1}{2}$	Dunterwaira ..	Left bank.
"	1	.....	Pool full of rocks, under water, the boats striking on them constantly.
"	..	Gollata	Left bank.
"	..	Peerkheira	Right bank.
"	1 $\frac{1}{4}$	.....	Rocks and shallows, and deep channels ; intricate passage.
"	..	Lahana Burda ..	Left bank
"	..	Semurla	Right bank.
"	5	miles.....	kos by the Natives.
			[N.B.— The laden boats require 18 inches of water to float freely. The largest boat is 31 feet long, and less than 5 feet wide, laden with 2 $\frac{1}{2}$ mangles.
April 20th	..	.....	Left Lahana Burda at 7 A. M. ; arrived at Chikulda at 2 p. m.

Date.	Distance in Miles.	Names of Villages or Rapids, &c.	Remarks.
1848			
April 20th	1	.. .. .	Achota, right bank.
"	..	.. .	Pool, with rocks here and there.
"	1½	.. .	Fine deep pool; some rocks along the left bank.
"	..	Ekulara .. .	Right bank.
"	..	Owhee .. .	Left bank; a ferry here; a tope of fine tamarind trees.
"	..	.. .	500 yards; dangerous hidden rocks, with some of their points just appearing in the middle of the river.
"	1	.. .	Good pool.
"	..	Kaythee .. .	Right bank.
"	..	.. .	Shallow; 2 feet water; studded with rocks; no regular channel.
"	..	Kamama Tur (bow-shaped).	300 yards; 2 feet water; deepest channel with bad rocks in the middle; boats can safely striking on them; in one place the boats were let down with ropes.
"	1½	..	Shallow, with rocks and loose stones the whole way; boats continually striking on them. There is a ford here.
"	..	Gan Ie .. .	Right bank.
"	..	Peeplodh .. .	Left bank.
"	0½	.. .	Shallows.
"	..	Domkhul Tur .. .	A very bad rapid; 15 inches water; rocks in the channel, against which the current rushes with great force; a fall of 3 feet; boats dragged over; some loose stones being removed.
"	1	.. .	Shallows and rocks; 15 inches water in some places.
"	..	Bhaboot .. .	Left bank.
"	..	Zowhoor .. .	Right bank.
"	0½	.. .	A bad sunken rock in the middle of the river; one of the boats got on it, and was nearly rolling over; the rest of the river a fine broad pool, with 5 or 6 feet water generally.
"	0½	.. .	Pool, 5 feet water.
"	..	Kusrawath .. .	Left bank.
"	1½	.. .	Rocks and shallows; channel between irregular low rocks, &c.
"	..	Chikulda.	
	8½	miles .. .	1 kos by the Natives.
April 22nd	..	.. .	Left Chikulda in a boat 30 feet by 4½ feet.
"	1½	.. .	Pool; 6 to 8 feet water.
"	..	Bilkheira .. .	Left bank.
"	..	.. .	4 feet water.
"	..	.. .	Shallow; 18 inches water.
"	..	.. .	Rocks.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1848			
April 22nd	..	.....	A small rapid ; 1 foot water.
"	1 $\frac{1}{4}$	.....	Shallow in some places, with less than 1 foot water ; little rapids and rocks.
"	..	Nandgaum	Left bank.
"	..	Kaperkheira	Right bank.
"	0 $\frac{1}{2}$	.....	Shallow the whole way ; boat shoved along ; in some places not 6 inches water ; sandy bed all across the river.
"	0 $\frac{1}{2}$	.....	A nice little pool ; 5 feet water ; no rocks.
"	..	.....	Rocks scattered all across the river, with irregular channels of 4 and 5 feet water.
"	0 $\frac{1}{2}$	.....	A bed of rocks ; narrow channels ; 3 and 4 feet water.
"	0 $\frac{1}{2}$	.....	River spread with rocks ; a small pool ; 4 feet water.
"	..	Kutura	Left bank.
"	0 $\frac{1}{2}$	.....	A fine broad, deep pool.
"	..	.....	River spread with low detached rocks ; channels between ; deep water.
"	0 $\frac{1}{2}$	.....	The same as above.
"	..	Sonevul	Left bank.
"	..	Kurronja	Right bank.
"	1 $\frac{1}{2}$	.....	Fine deep pool.
"	..	.....	A small bed of rocks in the middle of the river ; dangerous.
"	0 $\frac{1}{4}$	Kotral	Right bank.
"	..	.....	Pool continued.
"	..	.....	Ooree nudee joins here, on the right bank.
"	..	.....	Pool continued.
"	..	.....	Rocks on the right hand.
"	0 $\frac{1}{2}$	.....	2 feet water ; low, sunken, and some appearing ; rocks spread all over.
"	0 $\frac{1}{4}$	Meijnaik Tur	9 inches water ; full of rocks in the channel ; scarcely any passage at all. The laden boats could not have been got over ; a fall of 3 feet.
"	..	.....	A small old pagoda on the right hand, exactly opposite the fall ; my boat was literally lifted over.
"	..	.....	Another similar rapid, but not so bad.
"	..	.....	Goce nudee joins here, on the left bank.
"	1 $\frac{1}{2}$	.....	Deep pool ; two or three rocks just above the water.
"	0 $\frac{1}{4}$	Gowlia Tur	4 and 5 feet water ; bad rocks in the channel, and at its outlet.
"	0 $\frac{1}{2}$	.....	A small rapid ; 9 inches water ; no regular channel.
"	0 $\frac{1}{4}$	.....	Bluff peak of the first hill on the immediate banks of the river ; right bank.
"	..	.....	Fine deep and broad pool.
"	0 $\frac{1}{2}$	.....	Pool continued ; sunken rocks ; some just showing themselves above the surface of the water.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1848 April 22nd	..	.....	Ruins of the Gurhee of Deheir, on a hill on the right bank.
"	..	Deheir	Right bank.
"	1	.....	Pool continued; broad and deep.
"	..	Beejasein Phal	A shallow; stones to be removed; not 6 inches water.
"	0½	Beejasein	Left bank.
"	1	.....	Deep, broad pool, with numerous sunken rocks; jhow jungle on the right hand; resort of tigers.
"	..	Moorgutta Tur.	3 and 4 feet water; channel winding and bad, with rocks.
"	0½	Moorgutta	Left bank.
"	1½	.....	Pool, with sunken rocks; shallows; no regular channel.
"	..	.....	Tar; shallow, &c.; good for a quarter of a mile.
"	..	Dhurmray	Right bank.
	14½	miles.	According to Natives 7 kos.
April 23rd	..	.....	Left Dhurmray at 6 for the Hurun Pall.
"	..	Dhurmray Tur.	Considered the head of the Hurun Pall passage; 18 inches water; bad rocks for 200 yards.
"	1	.....	Small pool, with rocks; 4 feet water; a rapid; 18 inches water, 6 feet channel.
"	..	.....	River full of rocks; deep water.
"	..	Hurun Pall	Deep channel; 8 feet water, current not strong; no fall; fine bluff rocks in the middle of the river, one on either hand from the Pall.
"	0½	.....	Deep channel between rocks, 10 or 12 feet wide.
"	0½	.....	Deep, narrow pool; slight current.
"	..	Hurun Pall Ghat.	A fall of 6 feet in 30; passage 8 or 10 feet, with projecting pointed rocks on each side; very bad and dangerous.
"	..	.....	100 yards; rapid.
"	..	.....	Fall 3 feet; not so bad as the first, but difficult, from the water dashing on a projecting rock on the right hand; channel 10 or 12 feet.
"	..	.....	100 yards; rapid.
"	..	.....	Fall 4 feet; much like the above.
"	..	.....	Deep channel below the rapids.
			<i>Left hand Channel from Hurun Pall.</i>
"	..	.....	300 yards; deep and clear.
"	..	.....	Channel between rocks; deep and clear.
"	..	.....	Channel between rocks; deep water.
"	0½	.....	Fine deep, broad pool; no rocks.

Date.	Distance in Miles.	Names of Villages or Rapids.	Remarks.
1818 April 23rd	The bed of the river covered with low, sunken, and small isolated rocks; no regular channel; in some places 6 inches water over the rocks, and then suddenly deep.
"	No passage at all.

At 10 A. M. returned to Dhurmray, and at 11 o'clock set sail for Chikulda with a fresh westerly breeze. Arrived at 3 A. M.

(Signed) R. H. FENWICK,
In charge of the Coal Fleet.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To J. G. LUMSDEN, Esq., Secy. to Govt., Bombay.

Dated Indore Residency, 22nd May 1848.

SIR,

I have the honour to transmit, for submission to the Right Honorable the Governor in Council, the annexed copy of a letter from Captain Fenwick, reporting his arrival at Broach on the 15th instant, with 48 Bengal maunds (about 1½ ton) of coal.

By my despatch No. 538, dated 27th ultimo, His Lordship in Council was informed that a depot of coal had been formed at Chikulda, below which the Nerbudda was not navigable on the 23d of April.

Captain Fenwick, under instructions from me, procured two carts, with which, being laden, he proceeded to Kunnalee, on the Nerbudda, below Tullukwara. The road he found easy, and practicable for carts; and at Kunnalee, having procured boats, he continued his trip to Broach, the river being easily navigated in a boat of 36 maunds tonnage.

The coal has been delivered to the Collector, and Captain Fenwick will return to Chikulda, coming up in the boat in which Captain Evans went down last year, with a view to determine how high up the river above Kunnalee the Nerbudda is navigable at the season of its smallest depth of water.

Captain Fenwick will take the coal in store at Chikulda from thence to Broach as soon as the river is open, and the navigation safe, and thence to Bombay.

From all the information I have collected, I am satisfied that coal may safely be conveyed from Dharce to Broach between the months of August and

December, in any quantity for which there may be tonnage; but that between February and June the Nerbudda is not navigable.

As soon as a regular communication is opened, the return trade will go far to cover the cost of transit, as there would be a constant supply of goods to be brought up from Broach.

I have, &c.

(Signed) R. N. C. HAMILTON,

Indore Residency, 22nd May 1848.

Resident.

From Captain R. H. FENWICK, in charge of Coal,

To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Broach, 16th May 1848.

SIR,

This is simply to inform you that I arrived here yesterday, and to hand to you the accompanying receipt from Mr. Davies, the Collector. I am assured it will please you that the coal, which has been brought thus far, has been preserved, notwithstanding the cartage, shiftings, &c. I was advised by the Raja of Oodeypore to go from Chikulda to Kunnalee, instead of Tullukwara, as boats were not to be had there, and would have to be ordered up from Kunnalee at extra cost, and with the loss of two or three days; and besides, the distance to Kunnalee from Warna is less than to Tullukwara, owing to the reaches of the river. I met Mr. Mansfield, Political Agent Rewa Kanta, at Kunnalee, and received every assistance from him. Colonel Outram has acted in the kindest manner to me. He wished me to go to Baroda, but I may not do that just now. Mr. Davies aids me in every way. I could have taken the coal now here to Bombay, as I have been offered freight in a large pattimar which is just sailing out, but there is no object now. The boat brought down by Captain Evans is here; I am putting it in order, and shall take it up with me as far as the river will admit, and then I purpose travelling through the jungle to Chikulda. I hope the boats and boatmen will be ready to bring the coal down from that place as soon as the river fills. My hopes are getting up: but the river *must* be the channel for the coal down, and trade up. I shall be very anxious to go to Indore, and pay my personal respects to you. I could say more than by writing volumes. The cost of boatage from Kunnalee to this has been Rs. 6 (Baba Shahee) per boat. One carried 36 maunds of coal, the other 12 maunds, myself, and my small baggage. Regarding the river from Kunnalee, I do not know how I could better describe it to you than by comparing it with the Bagheeruttee and Hooghly from Berhampoor to Calcutta. The money accounts I shall have the pleasure of submitting to you as soon as I have a little rest.

I have, &c.

(Signed) R. H. FENWICK,

In charge of Coal.

Broach, 16th May 1848.

From G. A. BUSHBY, Esq., Secy. to the Govt. of India,
To A. MALET, Esq., Chief Secretary to Govt., Bombay.

HOME DEPARTMENT.

Dated the 13th May 1848.

SIR,

I am directed to acknowledge the receipt of your letter No. 679, dated the 26th ultimo, respecting certain coal-fields discovered near the river Nerbudda, and reporting the measures proposed by the Resident at Indore for working them, and the extent of aid already afforded by the Government of Bombay.

The experiment appears to the Governor General in Council to be a very expensive one, while the calculations on which it is based are so indefinite and inconclusive, that it is difficult to regard it with much confidence.

The Honorable the Court of Directors and the Supreme Government have long been desirous of ascertaining the real character of the coal mines lying near the banks of the Nerbudda; but as the services of Mr. Williams, the Geologist, could not immediately be made available for this purpose, the inquiry was of necessity postponed for a time. It is not stated in your letter whether Mr. Johnstone is qualified by geological attainments to pronounce a judgment on the point. It does not appear how the batch of coal sent to Dharee in March last is proposed to be conveyed to the coast; but Mr. Hamilton's own estimate of the cost of the coal per ton exceeds the price of English coal in the Bombay market.

Under all the circumstances of the case, so far as they are at present known, His Lordship in Council must hesitate to accord his sanction to the steps which are proposed to be taken by the Government of Bombay for the furtherance of Mr. Hamilton's plans: he would desire to be put in possession of more complete information on the subject; and I am directed to request, that pending further instructions no arrangements involving expense may be entered into, which are not of a temporary character.

I have, &c.

(Signed) G. A. BUSHBY,
Secy. to the Govt. of India.

Fort William, the 13th May 1848.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To the SECRETARY TO GOVERNMENT, Bombay.

Dated Indore Residency, 29th August 1848.

SIR,

I have the honour to state, for the information of the Right Honorable the Governor in Council, that Captain Fenwick reports having reached Broach by

water from Chikulda, with 239 sacks of coal, which have been lodged in a godown at the Custom House.

Copies of Captain Fenwick's letters are annexed ; and his Journal, as soon as received, shall be forwarded. Considering the craft,—with two exceptions the common ferry-boat of the Ghauts,—it is not surprising that two were swamped.

I have never entertained any opinion of the Nerbudda as a navigable stream for commerce ; yet many of the difficulties encountered by Captain Fenwick might have been lessened, and the passage of boats facilitated had nautical science been brought to the aid of the experiment.

It may be assumed as a fact, that coal can be transported down the Nerbudda, proper precautions being taken, and suitable boats provided, although for the purposes of commerce the river is valueless.

Captain Fenwick will, I trust, be considered to have merited the approbation of Government for his exertions. He will return to Broach, and proceed to deliver the coal now there to the authorities at the Dockyard in Bombay.

I have, &c.

(Signed) R. N. C. HAMILTON,
Indore Residency, 29th August 1848. Resident.

From Captain R. H. FENWICK, in charge of Coal,
To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated One Mile above Hamp, 3rd August 1848.

SIR,

This is simply to inform you that we arrived here yesterday. I am now writing from on board, and beg you will excuse errors. We have met with serious misfortunes : we lost one boat below the Hurun Pall,—it was dashed against a rock in the middle of the channel, and we saw nothing more of it till the next day. Yesterday at this place two boats were completely lost, and a third just had time to land her cargo. I shall not fail to send you my Journal from Broach, the moment I arrive there, which I expect to do by the 6th. The Nerbudda from Hurun Pall to this I think impracticable for purposes of traffic. Some of the boatmen with me accompanied Captain Evans last season, and they say that the river was higher then than at present, and they did not meet with these difficulties. I cannot express to you my admiration of the boatmen, and I would trust myself with them always.

I have, &c.

(Signed) R. H. FENWICK,
One Mile above Hamp, 3rd August 1848. In charge of Coal.

From Captain R. H. FENWICK, in charge of Coal,
To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Broach, 9th August 1848.

SIR,

I beg to acquaint you that I arrived here this morning at 8 o'clock, and immediately called on Mr. Davies, the Collector, who has kindly given me a room in his house, and godown at the Custom House for the coal, where it is now being deposited, and will be kept under my charge. I grieve to say we have lost 99 bags of coal. We met with another serious accident on the 5th instant, about three miles below the Mokree barrier. A boat which carried only 5 bags, with the Karkoon, and always brought up the rear, struck against a rock in the middle of the river, which is there about half a mile broad, and instantly filled. Luckily, the river was then subsiding, and it got fixed between two points. The boatmen swam ashore. The Karkoon was picked up by a boat pushed out for the purpose. The next morning the coal was taken out, and put on another boat, and the wreck brought off, and having been repaired, has been brought on here. It is necessary I should inform you that I believe there is not a single boat of the fleet that has not at one time or another been in danger, by being carried on rocks, or nearly swamped in the rapids, waves, or whirlpools. The large boat, the double boat, and the boat I was upon, have had narrow escapes. From all this, and the general character of the river between the Humn Pall and the Mokree barrier, I am confirmed in the opinion that it is not a navigable stream, available for the purposes of commerce.

I have, &c.

(Signed) R. H. FENWICK,
In charge of Coal.

Broach, 9th August 1848.

From Captain R. H. FENWICK, in charge of Coal,
To R. N. C. HAMILTON, Esq., Resident at Indore.

Dated Camp Chandore, 18th August 1848.

SIR,

I have not written to you since my letter of the 9th instant, as I was anxious to settle with the boatmen finally before I did so. I now have to inform you that seven of the Mundlairs boatmen having returned overland, refusing to serve for less than one rupee per diem each, I have left the large boat and the double boat at Broach, under the charge of the Collector. The boat which struck on the rock below the Mokree barrier was so much injured that it could not be kept afloat: I have left it also with Mr. Davies, and requested of him

to have it sold by public auction. This boat was an old one; but as I could get none other at Chikulda, and it being desirable that an empty spare boat should accompany the fleet, I brought it with me. The Karkoon with 5 bags of coal always brought up the rear in it.

Five of the Chikulda boatmen, and the boat brought down by Captain Evans last season, now form the fleet, which left Broach on the 14th instant, and I overtook it on the morning of the 16th at Jenore, the Collector having kindly lent me the Government bundel-boat to take me up so far. We arrived here this forenoon. We make very slow progress, although the river has subsided very much indeed. How we shall manage up the rapid I am unable to anticipate, nor can I guess in how many days we shall be able to reach Chikulda. This trip will, I trust, complete the experiment. I am not certain whether I shall be able to persuade the boatmen to come down with me again. I should like this very much, as I think I should make the voyage in six days. I shall not be afraid of the jungle fever until after the 15th of September. After my letter of the 9th instant, I have very little to say regarding the obstacles in the river between Hurun Pall and Mokree, and I am sorry that I shall not be able to send you my Journal before I reach Chikulda: but I may generally state in this place, that there was scarcely a mile of free navigation the whole way,—I mean at a stretch; and we encountered difficulties and dangers several times each day. I place the safety of the boats which escaped destruction to the skill, energy, physical strength, and cool courage and spirit of the boatmen, whose conduct I cannot sufficiently praise. I may almost say, though, that we trusted more to our being able to swim than to the boats, to reach Broach.

It may be necessary to detail here, for your information, the arrangements I made to run no risks needlessly, to ensure safety to the boats, and to meet all accidents, in as far as human foresight could effect it. I established order by nominating Muddun, the head Mundlarsn boatman, as chief, and Bholoo and Munna of Chikulda his deputies. Each boat was named, and directed to sail in its proper place. My boat always took the lead, and, according to circumstances, kept two or three hundred yards or more ahead of the rest. The large boat followed; then the double boat; the rest in their proper order; the empty or Karkoon's boat bringing up the rear. I had a black, a red, and white flag on my boat. The red hoisted ordered the boats behind me to push to shore without a moment's delay to the left bank; the black to the right bank; and the white to follow in my track. Whenever we came to any difficult places, the boats were put to; the headman went overland to examine; after that my boat was passed over, and if the channel was found practicable, they returned and brought on the rest, my boat being kept in readiness below the barrier, rapid, or whirlpool, to pick up the men in case of a boat being lost. This precaution saved some of the boatmen at the rapid above Hamp, and the Karkoon below Mokree.

* * I have already informed you that we have lost 99 bags of coal: 239 bags

of the present batch, and 48 that I left with the Collector in May last, form the total quantity now in Broach. A circumstance which very much distressed me was, that although during the night we had awnings put up, and secured the coal from the rain, which fell more or less every day from the 29th July to the 7th instant, in the day-time it was taken down, the wind being from the westward, and the bags were unavoidably exposed to the constant showers; but more than that,—the spray from the waves at the rapids frequently dashed over the boat from head to stern, and drenched everything in it. There was no remedy against this. The coal in the boat which struck on the rock above Hanp, and had just time to land her cargo, was completely wetted. However, although much of the dust has been washed out of the bags, I believe the bulk of the coal has not been injured. You may conceive from the above what would be the fate of valuable articles of traffic in such boats as these.

I have, &c.

(Signed) R. H. FENWICK,
In charge of Coal.

Camp Chandore, 18th August 1848.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To J. G. LUMSDEN, Esq., Secy. to Govt., Bombay.

Dated Indore Residency, 21st September 1848.

SIR,

In continuation of my letter No. 908, dated 29th ultimo, I have the honour to state, for the information of the Right Honorable the Governor in Council, that Captain Fenwick has arrived at Chikulda, having effected his return by water.

I beg to forward a copy of Captain Fenwick's Journal, which supplies some interesting particulars regarding the navigation of the Nerbudda,—a river which must now be pronounced not practicable for the purposes of commerce, though, with suitable arrangements and precautions, coal may be floated down during certain months of the year.

Should the Sonadeh coal-fields be worked, the coals must be lodged in depôts at convenient positions, and moved as circumstances will admit. I regret much that all my endeavours to find coal near Baug, or nearer the mouth of the river than Sonadeh, have hitherto failed.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

Indore Residency, 21st September 1848.

CAPTAIN FENWICK'S JOURNAL,

Alluded to in the preceding Letter from Mr. HAMILTON.

files Furl.

29th July 1848.—Left Chikulda at 8 A. M.

- 12 0 'o Dhurmrae; not a rock nor a ripple.
 1 0 urun Pall; no rocks in the channel, nor any difficulty.
 0 0½ enter the Bhorekeyree rapids. Had all the boats put to on the right bank, and taking with me four of the best boatmen, viz. Muddun, Bholoo, Munnia, and another, proceeded in my boat to examine the passage.
 1 0 horekeyree; channel at the narrowest part about 60 feet; very bad, from the high waves; the boatmen sent back for the rest of the boats; all shipped in water, the double boat the most.
 2 0 liver studded with bluff rocks, some of them several feet above water, some just under the surface. This is a very bad passage; the channel in some places 40 feet wide waves very high; all the boats shipped in water.
 0 0½ Very very bad; high waves current very rapid; rocks everywhere, and with difficulty avoided. One of the boats got fixed on a rock in the middle; other boatmen had to swim to it, and it took some time to get it off.
 0 1 Very bad rocks; the channel very winding, intricate, and dangerous.
 0 0½ rapid; very bad channel, studded with rocks; 30 feet passage; just below it a boat was dashed on a rock, and completely lost; 30 bags of coal gone. The boatmen swam ashore; a Bildar, who could not swim, was left on the rock during the night, and brought off the next morning; could not do it in the dark of the evening.
 0 0½ Put to, on rocks; no village. The fleet separated for the night; three boats got down a quarter of a mile; mine and two others below the rock and rapid, and three boats above it.

Total 18 0; miles by guess.

30th July 1848.—Put off at 8 A. M.

- 0 0½ Some rocks in the channel, and rapids; a very small pointed rock in the middle of the river, which widens here, and becomes free from danger; rocks on each hand.
 3 0 Clear and deep; only two or three rocks visible; a huge barrier of rocks across from bank to bank; 30 feet channel near the right bank. This place is called *Kalee Kuree*; high waves; rather bad; no other practicable channel. At 300 yards a bad rock in the middle, under water, very dangerous; current very rapid, and rushing on it.
 1 0 Isolated rocks all the way; channel not bad, being broad and deep near the left bank.
 1 0 Clear and deep; bluff high rocks in several places; three channels, not difficult; the left hand one is the best.
 A whirlpool, but not bad at present.
 1 0 Clear.
 A rapid; head of the Dupana barrier, and falls; dangerous rapids, from the channel not being well marked; very high waves for 400 or 500 yards. All the boats shipped in water except the large boat *Rewa-sunker*; the double boat the most.
 1 0 A field on the right bank, belonging to Dupana.
 0 0½ Dupana.
 A rapid.

Miles	Furl.	
0	0½	High waves the whole way; rocks in the channel, which is 40 feet wide, 10 feet deep, as almost all the channels are just now.
1	0	Rocks the whole way, but passage not difficult or dangerous, being broad and deep.
....		A rapid, but not dangerous; deep water and good channel.
0	0½	Bad rocks in the middle of the channel.
1	0	Not difficult.
....		A rapid for 300 yards; waves; a whirlpool, but not bad just now; rocks under water; channel broad and deep.
1	0	Deep water; rocks, immersed and isolated, all across; waves. The river has widened for the last two miles.
....		Bad rocks, some under water, some appearing; the channel near the right bank deep and good.
....		Kurhace, on the left bank. Found the lost boat on a rock, one side smashed in altogether; totally useless.
2	0	Abundance of water.
....		Some rocks in the middle of the river, and near the right bank; passage wide, and easy ripple.
2	0	Deep and broad.
....		A huge rockish land on the right hand, at the confluence of the Hutnee river, low rocks on the left hand; passage broad and deep.
2	0	Clear and deep from bank to bank.
....		Village and cultivation on the right bank.
....		A bluff, long rock-island near the left bank; broad, clear, and deep stream on the right hand.
0	0½	A long range of bluff rocks in the middle of the river; deep, good channels on either side.
0	0½	A rock-island near the right bank, passage on the left hand.
1	0½	A barrier and rapid, rocks and waves across from bank to bank; channel on the left hand, near the shore, only 20 feet wide.
0	0½	The head and first of the Bhactua barrier, falls and rapids <i>very very bad</i> , the river studded with low rocks from bank to bank, and apparently no passage.
....		Six bags of coal were taken out of the double boat this morning, and put on some of the others, <i>Rewasunker</i> taking 1 maunds more, making her cargo 5 mancees and 10 maunds.
....		Put to at half-past 1 P. M., on rocks on the left bank, opposite Bhactara.
20	0	miles by guess.

31st July 1818.

0	0½	Strong current; the boats let down with ropes, brushing along the sides of perpendicular precipices 20 to 30 feet high, along the left bank, the current rushing towards the barrier. The barrier or ridge of rocks extends for about 300 yards, studded with rocks, some just above the water, some under, no practicable channel. The boats were let down with ropes, and by the hand, knocking and bumping on the rocks the whole way, and in some places dragged over; 20 bags were taken out of <i>Rewasunker</i> , and carried over the rocks for about 150 yards. It and the double boat were taken over with much labour and difficulty, and we did not get over the work before 12 o'clock. This passage is very tedious, but not so dangerous, or attended with the same risk, as that below the Hurun Pall, for about 6 miles. <i>There</i> ropes cannot be used, nor punting be resorted to, and the oars are not powerful enough to command the boat through the winding channels; the current rushing on rocks on all hands.
0	0½	Pretty good.

Miles Furl.
....

The Beytana Ghat Barrier.—Rapids and falls. Put to on the right bank to examine them; forbidding and fearful. The main stream is on the left hand; *very, very, very bad* for 300 yards; high waves; almost a direct fall. Carried my boat over with four of the best boatmen to test it; the boat nearly filled. The laden boats could not have been taken down by this channel. Examined a narrow passage between rocks for 300 yards on the right bank. This is bad too, but there is no other; it is about 18 feet wide. All the Chikulda boats were lightened of 12 maunds each; *Rewasunkher* 13 maunds; and the double boat 24 maunds;—the two latter, and two of the Chikulda largest and best boats, were taken down the left or main channel, and four of the latter by the narrow one. The latter were managed with bamboos, the former with oars and paddles. Ropes cannot be used here. All shipped in water, and the double boat, as usual, a good deal. The right hand channel is dangerous, from not being more than 18 feet wide, with pointed, projecting rocks on either hand. In one place the waves here too were very high,—almost a direct fall; the water several feet deep. The coal, which was landed, was carried over the rocks for some 500 yards.

1 0 Put up on the rocks on the right bank, a little below the village of Beytana, and the rapids; the boatmen being knocked up, and it being late.

2 0 miles by guess.

1st August 1848.—Left from below Beytana at 7 A. M.

.... The river has fallen about 2 feet since yesterday evening. Leaving the rest of the boats moored, I proceeded in my boat with Muddun, Bhooloo, Munnia, and others, to examine the passage below, which appeared to be full of rocks and rapids.

1 0 At 300 yards there is a pointed rock in the middle of the passage, badly situated just above the surface, the current rushing on it with great force; deep water, rocks, and rapids the whole way; channel not well defined. My boat was put to, and the boatmen sent back for the others.

1 0 Haikuree; a gut or strait between perpendicular, precipitous cliffs, 20 and 30 feet high; near the right bank deep water and slight current. Width 70 or 80 yards; a very remarkable passage.

0 0½ High rocks on either hand, channel about 150 yards or so; deep water; a bad place for whirlpools, as the villagers say.

.... Surkuree, on the right bank.

.... Surkuree barrier, and rapid, called *Gulchee Ghat*, or *Tur*. A *very, very, very bad* passage; rocks across from bank to bank, some just above the water, some under; the latter are the worst. Only one difficult channel, in the middle, about 10 feet wide; deep water; current rushing; half the day lost in bringing the boats over.

.... For 100 yards channel from bank to bank; then rocks; a whirlpool; and then a very deep pool; a deep broad pool; a formidably large whirlpool, dangerous. A single mango tree on the left bank points out the spot.

.... At 400 yards the village of Sudree, on the left bank; a broad, deep pool.

.... At 300 yards a rapid; broad channel in the middle of the river; on either hand very bad rocks.

.... A village just below, on the right bank; a little cultivation on either hand.

0° 0½ Deep pool; several isolated rocks; channel deep and broad in the middle.

Miles Furl.

- ... Rocks and ripples.
 0 0½ For first 300 yards broad and deep channel on the left hand.
 0 0½ Deep pool.
 ... Rocks on the right hand ; a rock-island, channel on each side.
 0 0½ A pool.
 ... A bad rock in the middle, just above the water, and very little ripple to denote it.
 ... A village on the left bank ; a deep pool ; rocks on the right hand.
 ... Fields on the left bank.
 0 0½ Clear.
 ... Rocks on the right hand.
 0 0½ Nanka Ghat, barrier, rapids, &c.—*Very, very, very bad.* The boatmen compared it to Sahesur Dunnah. I examined the largest channel, which is in the centre, in my boat, and found it fearfully obstructed with rocks, rapids, rushing current, and their attendant perils ; waves peculiarly high, and little whirlpools or eddies ; the water swelling, and curving over the rocks, and then falling headlong into a deep trough. All this extends for a quarter of a mile. *Kewasunkher* was dashed against a rock, and nearly lost. Luckily none of the laden boats came down by this channel ; signals were made in time to prevent them. They took to the left bank, and came through another passage above the shore ; shallow, with rocks and waves, but nothing to be compared to the other. Put to at sunset, below the falls, on the left bank ; Selukda village on the right bank, Gunnoo Patel.

5 0½ miles by guess ; I think it must be something more.

2nd August 1848.—Left at 6 A. M.

- 1 0½ A deep pool.
 ... A bad rapid ; channel near the left bank.
 0 0½ A very bad rapid and whirlpool ; obliged to use ropes.
 0 0½ A pool.
 ... A very bad rapid ; high waves ; passage along the left bank.
 1 0½ Rocks, rapids, and high waves ; a very bad passage. I came down in my boat by the left hand channel, which we found not practicable for the laden boats ; sent back the boatmen to bring them down by the right hand channel, which is very shallow.
 0 0½ Deep sliding current ; clear channel.
 ... Put to, to examine below ; rocks everywhere ; one of the boats, the *Pundit*, struck on a rock, and was nearly lost.
 ... The village of Chipna on the right bank.
 1 0½ Half the way clear ; then bad rocks, rapids, and high waves. As usual, I took my boat down with Muddun, Bholoo, Munnia, and others, to examine the passage. Found *this one* not practicable for the laden boats. The channel to the right was selected, and they went back for them. To prepare for accidents, I had my boat ready below the rapid in the worst place ; ropes could not be used. There is a whirlpool under the fall or rapid. One of the laden boats first coming down, struck on the rock in the middle, and at the head of the channel, but got off, and was enabled to reach the shore, and land the coal, before it filled. Shortly afterwards two boats, although they avoided the rock, were dragged into the rapid and waves, swamped, and went down bodily ; nothing more seen of them. Some of the boatmen swam ashore, some were picked up by my boat. A young man got into the whirlpool, and we gave him up for lost, but fortunately he got hold of an oar, and being an expert swimmer,

Miles Furl.

landed himself low down. One of the two latter boats, being under water for some time, rose again to the surface, almost erect, in the centre of the whirlpool, and was brought to land. All this happened in the evening, one mile above Hainp.

- 61 maunds or bags of coal lost to-day; some of the Bildars and several of the boatmen have lost everything they had,—pots, pans, clothes, &c. This morning, when leaving Selukda, the following arrangements were made, and ordered accordingly:—Muddun was appointed chief, Bhooloo and Munnia his deputies. My boat was to lead at 200 or 300 yards, or more, in advance, according to circumstances; *Rewasunker* to follow; then the *Saugur* or double boat. The rest were named too, and to come next according to their appointed order. The Karkoon's boat, with only 5 bags of coal, was to bring up the rear. A red, a black, and a white flag were kept to my boat, to make signals: on the red being hoisted, all the boats were to pull ashore to the left bank instantly; the black pointed to the right bank; and the white directed to follow my boat.

6 0 miles by guess.

3rd August 1848.—Left above Hainp at 9 A. M.

- The two boats were repaired, 13 bags of coal put on board the small one, and 23 bags on the other, and 7 bags were taken in my boat; the *Saugur*, or double boat, was also considerably lightened.
- 1 0 A deep pool.
- A bad rapid; rocks just above the water, in the middle.
- Bhuroorgan on the left bank.
- 2 0 A strong current and whirlpool.
- *Bhalagooree*, called *Bygee-ka-Phur*.—A very narrow passage; high rocks on each hand; a very bad and dangerous whirlpool; very high waves; some of the boats had narrow escapes.
- 1 0 A narrow passage; huge rocks on either hand; stopped here for two hours, and sent on boatmen to examine the rapid and passage below.
- 0 0½ A very bad channel near the left bank; a bluff rock-island.
- 1 0 A bad rock in the middle of the channel; high rocks; on each hand a whirlpool.
- 2 0 Strong current; a whirlpool; a rapid; two rocks in the middle; high waves.
- 0 0½ Rocks; rapid and waves; a very bad and difficult passage.
- ... Peepul Chope on the left bank.
- 1 0 Put to at 5 P. M., on the left bank; half of the boat which was lost yesterday found here.

8 0½ miles by guess.

4th August 1848.—Left below Peepul Chope at 7 A. M. The river has risen a good deal.

- 1 0 Stream rapid and broad.
- A rock-island on the right hand.
- 0 0½ Rocks in the channel; a rapid, and waves.
- 0 0½ The same as above. There are two channels here; some of the boats came down by the right hand one, and some by the left passage; the latter is the worst.
- 0 0½ Clear. Put to, to examine below.
- Rocks, and strong current in the channel.
- 1 0 A rapid; rocks on the right hand.
- 1 0 A rapid; rocks on the left hand; cultivation along the right bank; teak trees.

Miles Furl.

0	0½	A bad rock on the right hand ; the current rushing on it.
...		A village on the right hand.
...		A rapid, and high waves.
0	0½	A bad rock in the channel ; a rapid ; high waves ; two date trees on the left bank ; cultivation.
...		A large, bad whirlpool.
0	0½	Put to, to examine the rocky passage below.
0	0½	Strong current ; a rapid ; very bad rocks in the middle of the channel ; bamboo bushes begin to appear.
0	0½	High rocks almost across the river ; put to on the right bank, to examine the passage ; channel along the left bank not bad.
2	0	Clear channel along the right bank and middle ; very strong current.
...		A village on the left bank ; river rising.
0	0½	Rocks in the middle of the channel ; put to, to examine, and allow the boatmen to take their breakfast.
1	0	Rocks, rapids, waves ; very bad. My boat was dashed against a small pointed rock in the middle of the channel ; it filled partially, heaved, swung round, and plunged into the trough and waves below, but got out again ; a laden boat would have gone down.
...		Put to, to examine below.
0	0½	A very bad rock, and below it a whirlpool ; very formidable ; almost all the boats got into it, were taken round and round for several times, dashed against each other, and got jammed in the vortex for a minute or two.
0	0½	Bad rocks and rapids ; river still rising.
0	0½	Very bad whirlpools, waves, &c.
0	0½	A very bad rock in the middle of the channel, and a strong current rushing on it ; very dangerous.
...		Put to, to examine the channel below.
0	0½	A rock on the right hand, of no consequence.
0	0½	Beautiful plantations, along the right bank, of palms, mangoes, and mahwa trees, and cultivation, interspersed with huts, the whole way. Two bad rocks in the middle of the stream.
0	0½	Rocks in the middle ; strong current ; plantations continued along the right bank, belonging to the village of Guddair.
1	0	Clear, broad stream ; put to, to examine a rapid below.
...		Strong current ; rocks on either hand, but not dangerous ; river still rising slowly.
1	0	Very, very bad rocks ; a rapid and whirlpools ; Surpon barrier, &c.
...		Sulpon or Surpon ; Mahadeo temple on the left bank. Put to under Surpon at 5 p. m.
14	0	miles by guess ; it may be something less.

5th August 1848, 8 A. M.—At Surpon ; boatmen attending the temple. The river has risen a little during the night ; heavy rain all night, and now continued. Put off at 9 A. M. Took another boatman on my boat to-day, having hitherto had only three.

...		Rocks on the left hand, to be avoided ; strong current.
0	0½	Rocks on the right hand ; current strong.
0	0½	Rocks ; a rapid ; caution required ; dangerous waves, and a bad whirlpool.
0	0½	Rocks on each hand ; channel good.
...		A pagoda on the right bank.
...		A village on the left bank ; palms, mango trees, cultivation, and huts along the right bank.

Miles Furl.

- 2 0 Rapids, currents, and rocks, but not bad.
 Commencement or head of *Mokree Ghat Phal Tar*, or barrier, falls, &c.
 Put to, to examine the passage; huts, palms, &c. along the right bank.
 Rocks all over and across the river; channel in the middle, 40 or 50 yards wide; very strong current, and high waves.
- 0 0 $\frac{1}{2}$ Clear.
 .. Strong current; a rock on the right hand; channel along the left bank.
 0 0 $\frac{1}{2}$ Strong current the whole way; very bad rocks in the middle; channel near the left bank.
 A whirlpool in the middle; rather formidable; current rushing towards rocks on the right hand; very dangerous; numerous eddies, or little whirlpools.
- 0 0 $\frac{1}{2}$ Mookur village on the left bank.
 Rocks, rapids, waves, whirlpools; all very bad.
 A large, huge rock-island in the middle; my boat took the less channel, which proved to be very bad and dangerous; whirlpools, waves, strong current, &c.; all very formidable. We thought ourselves in peril for a while; the boat was whirled and spun round and round, nearly filled by the waves, and was diagoed towards some rocks on the right hand, and just escaped by a few feet from being dashed to pieces. The boatmen, especially Bhuloo, showed great energy and presence of mind, and expertness on the occasion. This coolness was complete, unmoved by the imminent danger: with a few last strokes of the paddle, he kept the head of the boat off from a rock, which we expected it would be impossible to avoid. Put to on the left bank. All the other boats were *carried*; forced into the right hand channel, which luckily proved to be not so bad, got down safely, and put to on that bank.
- River studded with rocky channels; current rushing through them, with shicee forces, *all very bad*. It took some time to make a selection, by trying an empty boat over some of them. I consider this Mokree barrier as one of the very worst in the Nerbudda. I had a good view of it, and the river, for two miles or so, above and below, from a high rock, and it certainly looked quite frightful. The boatmen think the river half full, and say that it was higher when Captain Evans went down last season. The Karkoon's boat was first taken down; the boatmen returned, and carried over three others, with six men to each, and so got the whole down safely. My boat came into the right hand channel with a great deal of difficulty.
- 0 0 $\frac{3}{4}$ *Very, very bad rocks*; a rapid and a whirlpool at the bottom of the channel; all the above from the upper part of the Mokree falls, &c.; there is a *worse* passage yet below. At 2 p. m. all the boats arrived below the above whirlpool, and put to on the right bank.
- 0 0 $\frac{1}{4}$ Strong current,—a *torrent*, rapid waves, &c. along the left bank, and in the middle. No boats could possibly live there just now,—and this is the *main channel*. The boats were let down with ropes along the rocks, and over shallows on the right bank,—tedious work. The main channel or stream on the left, above alluded to, is studded with destructive rocks, the waves raging and lashing over them in spray and foam; numerous little whirlpools or eddies moving down in circular sweeps, and bubbling up from the bottom with a roar. From nearly the middle of the river to the right bank there are bluff rocks, with narrow passages of 10 and 12 feet, with little falls of 2 and 3 feet, and then suddenly deep.
- 0 0 $\frac{1}{4}$ Along the left bank the *torrent passage* continues worse than ever; nothing could live in it.

Miles Fur	
...	Nemrell on the right bank.
...	Thonia on the left bank, abreast of the worst part of the channel.
....	Just below there is <i>the fearful whirlpool</i> : it embraces the whole bed of the river, and I think we have scarcely encountered anything so awful and terrific. The boats were let down with ropes along the rocks on the right bank, still with much apprehension, for had they come within its influence nothing could have saved them. I take the river at this place to be between 300 and 400 yards wide, or more.
0 0½	Rocks on either hand
....	For 400 yards strong current, eddies, and little whirlpools.
..	Deep pool, no rocks in the river: the hills are receding; villages, cultivation, plantations, and tops of palms and other trees, all the signs of civilization, and of a thriving people, are here exhibited on both banks of the river.
..	Fine broad, still pool
0 0½	Last of the hills on the left bank.
2 0	Pool, a noble stream.
1 0	Current and waves, sunken rocks, dangerous from their not being visible.
..	A pagoda on the right bank.
0 0½	Rocks and rapids, dangerous, from the rocks not being seen, but immediately under the surface
0 0½	Put to at Emrio, on the right bank, Rajpcepla Ilagua, at 6 p. m. Just at this moment the empty boat with the <i>Pundit</i> struck on a rock half a mile above, filled, and got fixed, luckily the river is falling. Took my boat with seven selected boatmen,—Muddun, Bhooloo, Munna, Gylia, and others,—and after great exertions got up to the rock, when it became completely dark. In trying to approach it near enough to throw over a rope, we found it could not be done,—the current dashed us away past it, and we were obliged to leave the Karkoon and three boatmen to their fate for the night, relying upon the river not rising, in which case they would be quite safe. However, to provide against everything, I had one of the boats emptied forthwith, and kept ready to pick them up, in the event of the boat floating off the rock. At this moment (it was pitch dark) we heard a shout, and soon after the voices of persons in the water, and shortly after all the four landed safely where we had put to. The boat having missed him, the Karkoon, too, had managed to reach the shore, with the help of a couple of bamboos lashed together, but he was nearly exhausted. The rock is in the middle of the river, and the stream here is half a mile or more broad.
10 0½	miles by guess.
	6th August 1848.—The boat was brought off from the rock this morning.
....	Left Emrio at 10 A. M., having repaired the boat as well as we could; but it is quite shattered, and will barely keep afloat.
1 0	Rocks in the middle, a pagoda on the right hand; small sunken rocks, and ripples over them, on the right
1 0	Gurhasur, on the right bank a Gurher on the top of a small hill, and a pagoda at the foot, some sunken rocks and ripples along, and near the right bank.
1 0	Aktesur pagoda on the right bank. Nothing to remark; not a rock nor a ripple, smooth stream from bank to bank. Arrived at Chaudore in the evening, and put up in an old house of the Guikwar's.
3 0	miles by guess.

Miles Furl.	<i>7th August 1848.</i>
....	Left Chandore at sunrise, and arrived at Lechrah or Lillore at 5 P. M., on the right bank.
	<i>8th August 1848.</i>
....	Left Lillore at 4 A. M.; inspected the Kubeer Bar, or Mohmit's island; put to on an island at 4 P. M.
.	<i>9th August 1848.</i>
....	Left island at 6 A. M., and reached Broach at 8 A. M.

Chikulda, 15th September 1848.

(Signed) R. H. FENWICK.

From Captain R. H. FENWICK, in charge of Nerbudda Coal,
To A. MALET, Esq., Chief Secy. to Govt., Bombay.

SIR,

Dated Bombay, 24th October 1848.

I have the honour to enclose, to be submitted to the Right Honorable the Governor in Council, the original receipt from the Indian Naval Storekeeper's Office, dated the 23rd instant, for 11 tons and 10 cwt. of Nerbudda coal, delivered at the Coal Depôt.

I have also the honour to forward extract of an official letter of instructions from the Resident at Indore, furnished to me under date the 20th July 1848; and to solicit that you will do me the favour to obtain for me the orders of His Lordship in Council for my future guidance.

I have, &c.

(Signed) R. H. FENWICK,

Bombay, 24th October 1848.

In charge of Nerbudda Coal.

Extract from a Letter of Instructions from the RESIDENT AT INDORE, under date the 20th July 1848, to Captain R. H. FENWICK, in charge of Nerbudda Coal.

Para. 3. On arrival at Bombay you will make over the coal to Mr. Johnstone, or to the Steam Factory at the Dockyard, or to such other department as Mr. Johnstone may point out.

Para. 4. Having delivered the coal at Bombay, you will have the goodness to report to the Secretary to the Government in Bombay, and having done so, solicit the further orders of the Right Honorable the Governor in Council; reporting to me your proceedings.

(A true extract)

(Signed) R. H. FENWICK,

In charge of Nerbudda Coal.

From R. N. C. HAMILTON, Esq., Resident at Indore,

To Lieut. Col. P. M. MELVILL, Secy. to Govt., Marine Dept., Bombay.

Dated Indore Residency, 9th November 1848.

SIR,

I have the honour to acknowledge the receipt of your despatch No. 1604, dated 24th ultimo, and in reply to furnish a statement of charges and expenses on account of the coal experiment.

I have endeavoured to classify the several disbursements; but it is impossible to give them with that exactness which could fix the actual cost of raising and transporting a ton of coal, because a variety of charges have been incurred, as will be seen in the following abstract:—

On account of Mr. Johnstone's pay	Rs. 1,390	0	0
Ditto of Captain Fenwick's pay	1,650	0	0
Ditto of survey of the Nerbudda	400	4	11
Expended by Captain Evans in purchase of sacks, &c.....	177	1	0
The cost at the pits for workmen, &c.....	1,494	6	6
The cost of transport	1,960	5	3

Making a Total of....Rs. *7,498 7 8

There has been a greater expenditure in river transport, owing to the utter ignorance of all parties of the nature of the obstacles to be surmounted, and the total want of other means of transport than the common ferry-boat of the river: the novelty of the trip; its supposed danger; the dread of the jungle at its unhealthy time; and the unwillingness of the ferrymen to go beyond their usual beats, caused a higher rate of wages to be demanded, and to be allowed, than otherwise would have been admitted.

The fact that the coal can be raised at Sonadeh, and transported to Bombay, has, however, been established; and it is for the Government to determine whether a system of storing in depôts could not be adopted, so as to secure a supply of coal for the service of the steamers at any time it might be required.

In my letter No. 438, dated 31st March last, an estimate of the cost of raising coal is given. Contracts could be made with Bunjaras at a slight advance on the usual rates of hire.

The rate now charged by Bunjaras for the transport of grain or salt at the principal mart of Seonce, near Hurda, is 5 Nagpore rupees per 100 kos per manee of 6 matunds of 40 seers each, or about Rs. 20 a ton for 200 miles of distance; and supposing Bunjaras to be employed to convey the coal to Bombay by land, it would cost on delivery near Rs. 50 the ton.

But coal might be raised at the pits in any quantity, and stored at a convenient spot near the pits, so as to be ready at any time for removal.

* This amount should be Rs. 7,072-1-8.—Editor

this would not cost more than 12 annas per ton for raising, covering in, and making secure from the severity of the weather.

With reference to the sanction of Rs. 10,000 contained in your letter No. 544, dated 4th April last, I beg that the enclosed bill may be passed, that the accounts of this experiment may be finally adjusted, and charged in the public accounts.

I have, &c.

(Signed) R. N. C. HAMILTON,
Indore Residency, 9th November 1848. Resident.

From the Honorable the COURT OF DIRECTORS FOR AFFAIRS OF
THE HONORABLE EAST INDIA COMPANY, London,
To the GOVERNMENT OF BOMBAY.

Dated 8th November 1848.

OUR GOVERNOR IN COUNCIL AT BOMBAY.

We have read with much interest your letter No. 48, of the 25th April last, and its accompaniments, relative to the experimental operations in progress for obtaining coal from the Valley of the Nerbudda.

It appears that Mr. Hamilton, the Resident at Indore, under whose direction these operations are carried on, has ascertained that beds of coal exist at two places in the Baitool district,—at Sonadeh, where the seam is 20 inches thick, and at Mardanpore, where the coal is of better quality, and where the seam is 2 feet 4 inches thick. With the aid of Mr. Johnstone, who is described as a steam engineer of the Dockyard, whose services have been placed temporarily at Mr. Hamilton's disposal, 20 tons of the Sonadeh coal were procured and sent to Tullukwara, on the river bank, whither they were expected to be conveyed at an expense of Rs. 21 per ton, and where it was intended to ship them for conveyance to Bombay.

Mr. Hamilton estimated that the expense of working one shaft for twelve months would be Rs. 6,364, and that the return would be 10,920 tons of coal; and you have authorised him to expend Rs. 10,000, in order to test fairly the advantage of working the mine. If more than an experiment be intended, and if it be desired to work the mines with the view of supplying the Government demand for coal, Mr. Hamilton recommends that Mr. Johnstone be appointed to superintend the operations, with a salary of Rs. 600 per mensem for two years certain; that other appointments be made, raising the total cost of local superintendence to Rs. 1,000 per mensem; and that to every shaft that may be sunk, be attached an establishment of miners, &c., at an expense of Rs. 622 per mensem.

On the more important of these proposals you have expressed no opinion, further than by recommending Mr. Hamilton to confine himself for the

present "to feeling his way"; but you strongly urge us to permit Mr. Johnstone's services to be devoted to coal-mining for the period mentioned.

We are, however, not prepared to consent to this arrangement, which will divert for so long a period, from his immediate professional occupation in the Dockyard, the services of Mr. Johnstone, the Foreman of the Pattern-makers in the Bombay Steam Foundry, whence, as reported to you by the Superintendent of the Indian Navy, he can "ill be spared," and whither, consequently, he ought to return as early as practicable.

Still it is very desirable to ascertain the extent, value, and accessibility of the coal-fields of the Nerbudda Valley; and we approve of all you have hitherto done for the investigation of those questions. Unless, however, the experiment now being made should turn out much more favourably than there is at present reason to expect, it will afford little encouragement to adopt more extensive operations. The quality of the coal already discovered may be ascertained from the quantities which have by this time reached Bombay; and if it should prove to be as good as Mr. Johnstone imagined, the mines yielding it may become a valuable resource at some future period. But unless the cost of the carriage has been greatly overrated, or can be greatly reduced, coal can at present be obtained much more cheaply from other quarters. The conveyance from Sonadeh to Tullukwara alone, without counting the expense thence to Bombay, is reckoned at a sum equal to 42s. per ton, whereas the average contract price of coal purchased by us in England, and delivered at Bombay, including all charges, during the last three years, has been 32s.

It appears, therefore, that instead of immediately proceeding to work the mines of the Nerbudda Valley, the first thing to be considered is how the cost of conveyance can be reduced,—whether by the discovery of mines near the navigable portion of the river, or by the improvement of the roads to the mines already discovered.

We some time ago suggested that Mr. Williams, the Geological Surveyor, should be deputed to examine the coal-fields of the Nerbudda Valley. We observe that you have very properly communicated to the Government of India the proceedings and views reported in your present letter to us; and it may be proper for you also to inquire of the Supreme Government when it is probable that the services of Mr. Williams will be able to be spared for the purpose above mentioned. A survey of that gentleman would afford the means of judging whether it would be expedient to adopt any ulterior measures; but for the present it will be advisable to suspend operations, unless further information should warrant a more active course.

We are, &c.

(Signed) J. L. LUSHINGTON,
And other Directors.

Lon, 8th November 1848.

From R. N. C. HAMILTON, Esq., Resident at Indore,

To Lieut. Col. P. M. MELVILL, Secy. to Govt., Marine Dept., Bombay.

Dated Camp Bairsiah, 19th December 1848.

SIR,

Since my despatch No. 454, dated 9th November last, submitting the charges incurred in the coal expenses, I have seen Captain Fenwick, and learnt from him that the actual cost of conveyance of the coal from the pits to Bombay was as follows:—

From Sonadeh to Dharee on the Nerbudda, by Bunjara bullocks	Rs. 0	6	0
By water contract to Chikulda :.....	0	4	0
Ditto to Broach.....	0	8	0
By sea to Bombay (total hire Rs. 70)	0	4	0

Making a Total of Rs. 1 6 0

per maund, or Rs. 38-8-0 per ton.

2. Captain Fenwick states the boat on which the coal was laden at Broach for Bombay was of tonnage sufficient to have taken more than double the quantity of coal, and that the charge from thence to Bombay would not exceed 2 annas a maund : this rate would reduce the cost to Rs. 35 per ton.

3. To this being added the cost of raising the coal, which may be put down at a rupee the ton, we have the total charge to Bombay at Rs. 36 the ton.

4. If it be intended to have any quantity of coal raised for storing, I hope to be favoured with instructions at an early date, the healthy season for work having commenced. Without being hurried as to time, knowing what is required, where difficulties will have to be encountered, and what are the resources available, arrangements can be made by which the cost may be reduced, and, it is to be hoped, the coal-fields of the Nerbudda made available for our sea-going steamers.

5. In my former letters, I mentioned that a commencement had been made in sinking a shaft : the work was closed on the setting in of the rains, after the shaft had been sunk 35 feet. It is highly desirable to persevere in this work, and I hope His Lordship in Council will sanction an expenditure not exceeding Rs. 400 on this account, as it is expected the coal vein may be reached at between 70 and 80 feet from the surface.

6. I beg to annex a statement of the average cost of coal for the use of the Dockyard since 1844, which was furnished to me by the late Superintendent of the Indian Navy.

I have, &c.

(Signed) R. N. C. HAMILTON,

Resident.

Camp Bairsiah, 19th December 1848.

Statement exhibiting the Rates of the several Tenders for the Supply of Coal to the Indian Navy received between August 1844 and December 1847.

Date.	Quantity	Description.	Rate.	Remarks.
1844	Tons.			
August....	485	Hard Splint Coal..	13 0 0 per ton.	Delivered alongside.
1845				
March....	350	Newcastle	30 0 0 "	Delivered free of charges.
".....	600	.....	28 0 0 "	Ditto ditto.
April....	100	.....	30 0 0 "	Delivered alongside.
May.....	70	.....	30 0 0 "	
".....	20	.....	28 0 0 "	
October....	644	.....	18 0 0 "	Delivered alongside.
".....	325	.....	18 0 0 "	Ditto ditto.
December..	599	.....	16 8 0 "	Ditto ditto.
1846				
January ..	510	Hard Splint.....	18 0 0 "	
April	200	Ditto	16 8 6 "	Delivered at the depôt.
July	150	Carr's Hartley....	12 0 0 "	Delivered alongside.
September..	405	West Hartley	14 0 0 "	Ditto ditto.
October ..	100	Carr's West Hartley	14 0 0 "	Ditto ditto.
November..	300	Ditto ..	14 0 0 "	Ditto ditto.
1847				
January ..	70	Hootspur Steam ..	13 0 0 "	Ditto ditto.
December..	355	Glasgow	16 0 0 "	Ditto ditto.
" ..	50	Coking.....	16 0 0 "	Ditto ditto.

(Signed) JOHN CROFT HAWKINS, Commodore Commg.,
Officiating Superintendent, I. N.

Superintendent's Office, Bombay, 18th September 1848.

(True copy)

(Signed) R. N. C. HAMILTON,
Resident.

From Captain J. C. HAWKINS, I. N., Commodore Commanding,
Officiating Superintendent, Indian Navy,

To the Right Honorable LORD VISCOUNT FALKLAND,
President and Governor in Council.

Dated 30th December 1848.

RIGHT HONORABLE SIR,

With reference to Secretary Lieutenant Colonel Melvill's letter No. 1603, of the 25th October last, requiring a full and final report upon the specimens of coal received from the Valley of the Nerbudda, I have now the honour to

report to your Honorable Board, that 5 tons of the coal in question were put on board the steam-vessel *Medusa* for trial, and herewith beg to submit a letter from the Commander of that vessel, giving the result of the test, from which it will be seen that the coal is not of a description adapted for consumption on board steam-vessels, although in emergency it might be used.

I have, &c.

(Signed) J. C. HAWKINS, Commodore Commg.,
Officiating Superintendent, Indian Navy.

Superintendent's Office, Bombay, 30th December 1848.

From Lieutenant H. W. GROUNDS, I. N.,
Commanding the H. E. I. Co.'s Steamer *Medusa*,

To Commodore JOHN CROFT HAWKINS,
Officiating Superintendent, and Commanding the Indian Navy.

Dated the 28th December 1848.

SIR,

In forwarding the accompanying Report on Nerbudda coal shipped on board the *Medusa* for trial, I have the honour to inform you that a strict and careful investigation has been made to prove its qualities.

The large amount of earthy particles in the coal, which being purely incombustible, leaves a large quantity of clinker and dirt, in proportion of 58 to 1 of British coal, as will be seen by the annexed form; and as the clinker formed by it is of a soft form, spreading over the entire surface of the bars, thereby stopping all draught, I would respectfully beg to represent that the general use of it in marine purposes will be found to give but little or no favourable result, as it is almost impossible to keep steam up, even with the throttle-valve quarter open, and this as proved in the *Medusa*, whose draught is generally very favourable.

I have, &c.

(Signed) H. W. GROUNDS,
Lieutenant Commanding.

Bombay Harbour, 28th December 1848.

Report alluded to in the preceding Letter, on Nerbudda Coal, as tried on board the Honorable Company's Steamer Medusa, December 1848.

	British Coal.		Nerbudda Coal.		Remarks, 26th and 27th December 1848.
Time taken to get up steam.	From 1 to 1½ hour		1½ hour.		
Weight of one bucket of coal	102 lbs.		92 lbs.		Both small coal.
Weight of the same bucket again filled.	98 lbs.		91 lbs.		Ditto ditto.
Average consumption per hour under steam	Cwt. qrs. lbs.		Cwt. qrs. lbs.		The Nerbudda coal is very dirty, making it necessary to clean the fires very often, as is proved below, the soft nature of the clinker rendering the ripper almost useless.
	6	2 12	7	0 0	
With the above expenditure, the throttle-valve and steam-gauge, taken hour by hour, stood as follows	Throttle-valve.	Steam-gauge.	Throttle-valve.	Steam-gauge.	
	Open.	5 lbs.	Open.	5 lbs.	
	Do.	Do.	Do.	3½ to 4½ lbs.	
	Do.	Do.	Do.	Do.	
	Do.	Do.	Do.	3 to 4½ lbs.	
	Do.	Do.	Do.	Do.	
	Do.	Do.	open.	1¾ to 4 lbs.	
	Do.	Do.	do.	Do.	
	Do.	Do.	do.	Do.	
	Do.	Do.	do.	Do.	
	Do.	Do.	do.	Do.	
Ashes formed from coals during ten hours' steaming ..	1 bucket.		58 buckets.		Obliged to stop the engines, as the steam was below the atmospheric pressure, to clean all the four fires, as the Nerbudda coal had formed a cake over the bars, that effectually prevented the fires from burning.

(Signed) H. W. GROUNDS, Lieut. Commg.

„ HECTOR M. GRANT, Engineer.

From R. N. C. HAMILTON, Esq., Resident at Indore,

To Lieut. Col. P. M. MELVILL, Secy. to Govt., Marine Dept., Bombay.

Dated Indore Residency, 23rd April 1849.

SIR,

I shall be obliged by your submitting a request on my part to the Right Honorable the Governor in Council, that should any of the Nerbudda coal

remain, one or more experiments be directed to be made in the Steam Factory, with a view to ascertain its qualities. I am induced to urge this, as the last experiment reported (the particulars of which I have not seen) is so entirely opposed to the many previous ones.

It is a well established fact that the same description of coal will not suit every description of boilers, and therefore a further experiment seems desirable.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

From the SECRETARY TO GOVERNMENT, Marine Department, Bombay,
To the COMMANDER IN CHIEF OF THE INDIAN NAVY.

Dated the 25th May 1849.

SIR,

I am directed to transmit the accompanying copy of a letter from the Resident at Indore, No. 468, dated 23rd ultimo, and to request, that should any of the Nerbudda coal remain in store, it may be submitted to such tests, in the Factory or elsewhere, as may place its quality as far as possible beyond the reach of doubt, or question.

I have, &c.

(Signed) J. G. LUMSDEN,
Secretary to Government.

Bombay Castle, 25th May 1849.

MARINE DEPARTMENT.

From Commodore STEPHEN LUSHINGTON, Commander in Chief, I. N.,
To the Right Honorable LORD VISCOUNT FALKLAND,
President and Governor in Council.

MY LORD,

Dated Bombay, 18th August 1849.

With reference to Mr. Secretary Lumsden's letter No. 596, of the 25th May last, I have the honour to submit the enclosed Report of a Committee appointed to test the coal received from the Valley of the Nerbudda.

2. From this Report it will be seen that the coal in question, when tested in the state in which it was received, was, as formerly represented, very inferior but when separated by sifting from the foreign matter with which it had been unavoidably mixed up in the various stages of its transit to Bombay, it has been found nearly if not quite equal to the best description of Government coal.

3. From the result of this trial it may be inferred, that when better means are prepared for the transmission of the coal, it will render us independent in a great measure of the foreign supply, and, consequently, be a great acquisition to the resources of the country.

I have, &c.

(Signed) STEPHEN LUSHINGTON, Commodore,
Commander in Chief, Indian Navy.

To Commodore S. LUSHINGTON, Commander in Chief, Indian Navy.
SIR,

In obedience to your orders dated 13th June, directing us to assemble in Committee, for the purpose of testing a quantity of Nerbudda coal forwarded by Government for that purpose, we have now the honour to report, in a tabular form, the result of several experiments made at different times with the boiler of the Factory engine. The result is that the Nerbudda coal, when sifted, is in all respects quite equal to the best coal usually imported here for the use of the Government steamers. Whether the large quantity of sand and dirt which we found it to contain has been introduced on its transmission to the Presidency, we have no means of ascertaining.

Time of getting up Steam, and Quantity of Coal and Wood consumed.	Coal consumed per Horse-power during 7 hours' Steaming, Steam kept up at 4 lbs. Pressure	Ashes and Clinker per lb. of Coal consumed during 7 hours' Steaming.
<i>Nerbudda Coal as received.</i>		
62 min.; 330 lbs. of coal ; 56 lbs. of wood.	9.20 lbs. per horse-power.	0.434 lbs.
<i>Nerbudda Coal when sifted.</i>		
70 min.; 336 lbs. of coal ; 56 lbs. of wood.	7.60 lbs. per horse-power.	0.210 lbs.
<i>Best Government Coal.</i>		
85 min.; 301 lbs. of coal ; 56 lbs. of chips.	7.85 lbs. per horse-power.	0.204 lbs.

(Signed) R. ETHERSEY,
Assist. Supt., and President.
,, A. CURSETJEE,
Chief Eng. and Insp. of Mach.
,, D. MACLAREN,
1st Assist. to Chief Engineer.

Bombay, 13th August 1849.

From Lieut. Col. P. M. MELVILL, Secy. to Govt., Marine Dept., Bombay,
To the RESIDENT AT INDORE.

Dated the 6th September 1849.

SIR,

With reference to the letter from this department, No. 597, dated 25th May last, I am directed to transmit for your information the accompanying copies of a letter from the Commander in Chief of the Indian Navy, dated the 18th ultimo, and its enclosure, reporting the result of a further trial which has been made of the coal obtained from the Valley of the Nerbudda.

I have, &c.

(Signed) P. M. MELVILL, Lieut. Colonel,
Bombay Castle, 6th September 1849. Secretary to Government.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To J. G. LUMSDEN, Esq., Secy. to Govt., Bombay.

Dated Indore Residency, 17th October 1849.

SIR,

I have had the honour to receive your despatch dated 6th ultimo, forwarding copy of the Report on the recent trial of the Nerbudda coal; and with reference thereto, beg to forward, for submission to the Right Honorable the Governor in Council, copy of my address to the Government of India, and of the reply thereto, conveying sanction to the disbursement of Rs. 500 in sinking a shaft in the coal-field at Sonadeh.

I have, &c.

(Signed) R. N. C. HAMILTON,
Indore Residency, 17th October 1849. Resident.

From R. N. C. HAMILTON, Esq., Resident at Indore,
To Sir H. M. ELLIOT, K.C.B., Secy. to the Govt. of India,
With the Governor General.

Dated Indore Residency, 12th September 1849.

SIR,

Having received from the Government of Bombay a copy of your despatch No. 399, dated 13th May 1848, I became informed that the Most Noble the Governor General did not consider it desirable to prosecute further the experiments on the Nerbudda coal raised by me at Sonadeh, and forwarded to Bombay under the charge of Captain Fenwick (Nizam's establishment), by

the Nerbudda; that, in fact, the experiments had established the unfitness of the coal.

2. Feeling satisfied that there must have been some mistake, I addressed the Bombay Government on the subject, requesting a further experiment might be made, those which had formerly been reported having given such very different results.

3. I have now the honour to forward a copy of my letter,* and of the reply thereto from the Governor in Council, with a copy of the despatch from the Commander in Chief of the Indian Navy, submitting the Report of a Committee assembled to test the coal which remained in store.

4. This Report fully supports those formerly made; and in the words of His Excellency the Commander in Chief, "when better means are prepared for the transmission of the coal, it will render Bombay independent in a great measure of the foreign supply, and, consequently, be a great acquisition to the resources of the country."

5. Whether, under these circumstances, it may be worth while to incur an expense of Rs. 500 in sinking a shaft, as originally proposed by me, next February, is for the Governor General to decide. Should His Lordship be pleased to sanction this outlay, I will with pleasure make the necessary arrangements.

I have, &c.

(Signed) R. N. C. HAMILTON,

Indore Residency, 12th September 1849.

Resident.

From P. MELVILL, Esq., Under Secy. to the Govt. of India,
With the Governor General,

To R. N. C. HAMILTON, Esq., Resident at Indore.

SIR,

Dated Simla, 6th October 1849.

In reply to your letter dated the 12th ultimo, No. 77, respecting the Nerbudda coal, and with reference to the 5th paragraph, I am directed to communicate the sanction of the Governor General to the expenditure of Rs. 500 for sinking the shaft proposed by you as an experiment.

I have, &c.

(Signed) P. MELVILL,

Under Secy. to Govt. of India, with G. G.

Simla, the 6th October 1849.

(True copy)

(Signed) ALFRED HARRIS,

Offg. 1st Assist. to Resident.

From R. N. C. HAMILTON, Esq., Resident at Indore,

To Lieut. Col. P. M. MELVILL, Secy. to Govt., Marine Dept., Bombay.

Dated Camp Sindwah, 20th January 1851.

SIR,

The Government of India, when the experimental dispatch of coal from the Valley of the Nerbudda, sanctioned by the Honorable the Governor in Council, was in progress, authorised an expenditure of Rs. 500 in sinking a shaft, with a view to ascertain the extent and direction of the coal-bed from which the sample forwarded to Bombay in charge of Captain Fenwick (Pension Establishment) had been raised, under my orders, by Mr. A. Johnstone, recently appointed to the Coal Department in Bombay.

2. I have not yet, however, expended the amount sanctioned; but as the season for sinking the shaft has arrived, I would wish again to bring the very important subject of coal being supplied for our own territories under the consideration of the Right Honorable the Governor in Council, because I have heard that a great scarcity of coal, owing to the loss or detention of the colliers from England, is now felt in Bombay; and, indeed, owing to a deficiency of coal, the steamer *Queen*, on her recent voyage from Aden, was compelled to break up part of her lower deck, a portion of the paddle-boxes, and one of the large boats.

3. Such occurrences, and the possibility of their recurrence, induce me to press on the Government the advantage of having a large quantity of the Nerbudda coal raised and transported to Broach, there to be available to meet any emergency.

4. Mr. A. Johnstone is now in the Government Service, and attached to this department: from no one can better information be obtained, and to no one could the duty be entrusted with better prospect of success. Captain Fenwick, too, is likely to be available, should his services be required; or he might be employed on a salary of Rs. 4 per diem to raise coal during the dry season, and arrange for its transport during the rains, if only the Government will incur a certain outlay, or the expense which may be absolutely necessary to raise a given quantity of coal, in addition to the pay of Rs. 4 per diem for superintendence.

5. I shall be most happy to render every aid in my power; and, if Captain Fenwick's services should be desired, to secure them, he having recently completed an inquiry into the teak forests, on which he was employed by the Madras Government.

I have, &c.

(Signed) R. N. C. HAMILTON,
Resident.

Indore Residency, Camp Sindwah, 20th January 1851.

From Lieut. Col. P. M. MELVILL, Secy. to Govt., Bombay,
To the SECRETARY TO THE GOVERNMENT OF INDIA.

Dated the 28th February 1851.

SIR,

With reference to your despatch No. 133, dated 17th February 1849, prohibiting this Government from incurring any further expense upon the coal mines of Sonadeh, I am directed by the Right Honorable the Governor in Council to transmit, for the consideration of the Government of India, the accompanying copy of a letter from the Resident at Indore, No. 79, dated 20th ultimo, urging the expediency of having the mines in question worked, and a coal depôt formed at Broach, to meet any emergency which may arise.

2. The Governor in Council directs me to observe, that no argument can be needed to prove the importance of having a depôt of coal at Broach available when required ; but it has not yet been rendered certain that coal of a quality such as can be used by sea-going steamers can be obtained from the mines in the Nerbudda Valley.

3. A combination of unfortunate accidents lately caused a great and alarming deficiency of coal in the Aden depôt ; but this, I am to state, could neither have been prevented nor rectified by any store at Broach : there was coal sufficient in Bombay ; but the difficulty felt was the expense and loss of time in transporting any quantity to Aden.

4. The Resident, I am further to observe, is misinformed in attributing the long voyage of the Steamer *Queen* to any want of fuel. The Commander in Chief of the Indian Navy, as will be seen from the accompanying extract paragraph 2 of his letter dated 12th instant, has reported that she had on board her full stowage of coal, and no complaint was made of its quality. The detention in the passage arose from other causes.

I have, &c.

(Signed) P. M. MELVILL, Lieut. Colonel,
Bombay Castle, 28th February 1851. Secretary to Government.

From F. J. HALLIDAY, Esq., Secy. to the Govt. of India,
To Lieut. Colonel P. M. MELVILL, Secy. to Govt., Bombay.

HOME DEPARTMENT, MARINE.

Dated the 11th April 1851.

SIR,

I am directed to acknowledge the receipt of your letter dated the 28th February last, transmitting a communication from the Resident at Indore, urging the expediency of having the coal mines of Sonadeh worked, and suggesting the establishment of a coal depôt at Broach.

2. By my letter of the 17th February 1849, the Right Honorable the Governor in Council was informed that it was the intention of the Supreme Government to depute Surgeon McClelland to the Nerbudda Valley, with the view of examining and reporting on the coal-fields at Sonadeh. Hitherto, however, it has not been found practicable to give effect to this intention, owing to the employment of Dr. McClelland on other duties. But as the recent arrival from England of Professor Oldham, appointed by the Honorable the Court of Directors to conduct a Geological Survey of India, may place the Supreme Government in a position to carry out, hereafter, the intention above referred to, I am directed to acquaint you, that as soon as Mr. Oldham shall have completed his examination of certain localities under the Bengal Government, the President in Council will take into consideration the propriety of deputing him to the Valley of the Nerbudda. Until then, the President in Council hopes there can be no objection to the survey of the coal-fields at Sonadeh being deferred.

I have, &c.

(Signed) F. J. HALLIDAY,
Secy. to the Govt. of India.

Fort William, the 11th April 1851.

Extract Paragraph 11 of a Despatch from the Honorable Court to the Government of India, dated the 18th June 1851, No. 4.

11. It is very satisfactory to find that renewed experiments on this coal have been attended with more encouraging results than were at first obtained. It would seem that the apparent inferiority of former specimens of the coal was owing to the intermixture of a quantity of foreign matter; but that when freed from such matter, the coal has been found nearly equal in quality to the best English coal.

EXTRACTS FROM A REPORT

RELATING TO THE

NERBUDDA RIVER AND VALLEY,

BY

MR. J. J. BERKLEY,

CHIEF RESIDENT ENGINEER, BOMBAY, OF THE GREAT INDIAN PENINSULA
RAILWAY COMPANY;

ADDRESSED TO THE

COMMITTEE OF DIRECTORS OF THAT COMPANY,

Under date the 6th October 1854.

EXTRACTS FROM A REPORT

RELATING TO

THE NERBUDDA RIVER AND VALLEY.

*

It might appear that it would have been advisable to carry the main line of the Great Indian Peninsula Railway through Berar by Nagpore, instead of by Asseer, Hurda, and Hooshungabad, into the Nerbudda Valley, and so on to Mirzapoor; but an examination which Mr. Graham has made, of the country between Nagpore and the Nerbudda, has proved that course to be most unfavourable for a line of railway. Moreover, the route which we have taken passes through a populous and well cultivated district, while the other, between Nagpore and the Nerbudda, would cross an almost unbroken jungle. At the close of next season I shall be able to report to you more fully upon this subject.

The line comprised in Section No. 3 commences from the Asseerghur and Boorhanpoor road, at one hundred and fifty-three and a half miles, and traversing a plain (smooth for three miles, but beyond that intersected by numerous deep narrow ravines), reaches the foot of the Satpooras, which it ascends by a series of easy reverse curves. Between the hundred and fifty-eighth and hundred and sixty-second mile, it crosses four large nullas, which, rising among the hills, flow out as mountain torrents, and, scouring to a great depth into the light soil of the plain, and fed by the minor streams, soon become formidable rivers. Where we cross them, however, the works are inconsiderable, although they are the most extensive upon these nine miles of the section. After crossing the river Pandar by a bridge about fifty-five yards long, the line takes a direction a little to the west of north, and, about the hundred and sixty-seventh mile, crosses the road from Asseerghur to Sewul, at a distance of six miles from the former place; and then, climbing the hill for about three miles, bears north-east, and passing Umdanuggur, reaches the summit of the Satpoora range at one hundred and seventy-five miles and three quarters. The height of this summit is inconsiderable, being only three hundred and ninety feet above the level of the Taptee Valley; and its ascent is effected in a distance of twelve miles, without any works that call for observation, and with various gradients, the worst of which is 1 in 100 for a length of about a mile and three quarters. From the

summit the line descends by a gradient of 1 in 118, to the hundred and seventy-seventh mile, where Section No. 3 terminates.

Between Asseerghur and the summit, the line passes over the trap formation; but the rock appears upon the surface only in a few places, and the earthwork will not be of an expensive character: stone suitable for building, teak, and ballast, are procurable in abundance for the works along these twenty-three and a half miles. There are very few level crossings; and only one small station, at the Asseerghur and Sewul road, will be required.

Tables of the curves and gradients are appended. They are both of a good working character, one-half of the section being either level or of first class gradients, and straight; and when it is considered that the Satpooras, one of the most formidable ranges upon this side of India, are surmounted by them, they are far more favourable than I expected it would be possible for us to obtain.

Some improvements may probably be made hereafter in this portion of the line; but they will not be of such importance as to affect my estimates, or to alter materially the general character of the section.

The next section of the line, No. 4, extends from the hundred and seventy-seventh mile, near the Asseer summit of the Satpooras, to Charwar, in the Valley of the Nerbudda, two hundred and thirty and a half miles; but no plan of it has been made, for the reasons which I have already assigned. Its course is by Ruttyghur, far to the east of Mandwa, and in a direction parallel to the river Suktha, and at a considerable distance from its right bank. It crosses the road from Peepleod at the hundred and eighty-second mile, the road from Bhamghur to Goondwana in the hundred and ninety-second, and the rivers Gungapot and Ogguny at the two hundred and second and two hundred and fourth miles, with small viaducts. From the Ogguny, it rises by a gradient of 1 in 132 for three miles and a quarter, and then descends by the same gradient for two miles, to most favourable ground, along which it runs to Charwar for a distance of twenty miles, without encountering any works that call for notice.

From Boorhanpoor to Charwar the line passes through a thickly wooded country. It is the direct route, but lies to the east of the present course of the traffic from Hurda, which there follows a circuitous road by Jawar, Kurdwa, Boregaon, Asseer, and Boorhanpoor, because along that route there are more halting-places; but Captain Keatinge, the Political Agent in Nimar, has already had a survey made of a road by Peepleod and Jawul, so that the course followed by the line will there meet the requirements of the traffic. The soil along this section is composed of that indurated trap mixture of sand, perished stone, and clay, which is here known by the name of Moorum, and is very favourable for our excavations. The works upon it are of a light description, and the gradients, of which a table is appended, are good; and the direction of the line is very favourable. Some improvements may, perhaps, be effected in it when the line is laid out for construction, and, in particular, I

may mention that the summit which I have described at the two hundred and sixth mile may, I believe, be altogether avoided.

Observing from the returns of Sir Robert Hamilton, Bart., Resident of Indore, and Captain Keatinge, that there is a decided set of the trade and passenger traffic from Hurda and the Nerbudda Valley towards Indore, and with a view of approaching the rich iron mines of Chandgur and Ponassa, a trial branch line has been laid out, and the section of it taken from Hurda to Poornee, as shown in the accompanying general map of the Nerbudda Valley. Should it be decided to extend your railway through Nimar to Indore and Agra or Delhi, it would be a question whether the line from Asseer summit might not be carried further to the west along the course of the river Suktha, as in that case the Bombay and Calcutta and the Bombay and Agra lines would diverge near Poornee, and the trial section which has been taken would form a portion of the line to Mirzapoor.

The stations upon this section will be at Charwar and Hurda.

Section No. 5 commences near Charwar, at a distance of two hundred and thirty-one miles from Munmar, and three hundred and ninety-one miles from Bombay, and extends up the Nerbudda Valley to the Towah, one of its tributaries, at the three hundred and third mile. No survey has been made of this line as far as Charkeira; but it has been accurately laid out upon the ground, and a reference to the section will show that it presents favourable features in every respect.

From Charkeira, the line runs to the north of Timboornee, and at the two hundred and sixty-sixth mile crosses the river Gunjal, which is one hundred and ninety yards wide, and its floods rise to a height of forty feet. From this point it continues of an equally favourable character for twelve miles, where it passes the very busy and prosperous town of Sewnee. It thence keeps along the flat and easy ground of the Nerbudda, and, passing about eight miles to the east of Hooshungabad, reaches the river Towah at the three hundred and third mile, which is the termination of this section.

Nothing could be more favourable in every respect than the whole of this section, seventy-two miles in length. The only work upon it is the crossing of the Gunjal, which is of moderate extent, and very much resembles the river crossings upon our experimental line between Callian and Wasindre. Nearly the whole of it is straight, and the gradients are unexceptionable. The country it traverses is productive, populous, and active. Nothing, in fact, could exceed the advantages of the district from Hurda to the Towah. It is a fine level plain, presenting every facility for the construction of a railway, and covered in all directions with rich abundant crops, fine trees, and prosperous villages; and a reference to the plan will show how many communications already exist upon it. These roads have been carried under the railway in many instances, and the level crossings thus reduced to a moderate number. The stations upon this section will probably be as follows:—

At Timboornee, Sewnee, Dakaira, for Hooshungabad, Charkeira, and Kotra.

Section No. 6 commences on the left bank of the river Towah, at the three hundred and fourth mile from Munmar, and extends to Katiotia, at the three hundred and ninety-second mile. The Towah is very nearly dry during the fair season, but in the rains its shallow though very wide course is flooded for a width of twelve hundred and seventy-six yards from bank to bank. The floods, however, have seldom been known to rise above its lower or eastern bank, and I therefore believe that its channel might very safely be contracted to a considerable extent. The bed of this flood stream is a mass of loose sand for a depth of about twelve feet, when it becomes firm, and suitable for either piling or masonry foundations; but in the present instance I have estimated this viaduct of simple timber piling, and gearing wide enough for a single line of rails, and extending along the whole channel of the river. The course of this river has been carefully examined from Hooshungabad to Kaila, near the hills, where it issues at even a greater width than at our crossing; and no place has been found more favourable than the spot best suited for the direction of the railway. Under any circumstance, therefore, it must prove an expensive work; but beyond that, there is no feature in it which is at all calculated to affect the eligibility of the line.

From the Towah, the line extends for nine miles over a level plain, and, entering upon some undulating easy country near the three hundred and fourteenth mile, proceeds in almost a straight line, and without a single objectionable feature, to the three hundred and fifty-eighth mile, where it crosses the river Doodhve, at the village of Joonhetti, with a viaduct of ordinary dimensions. From the crossing of this river the line runs quite free from works along the surface of the country for fourteen miles, where it approaches the town of Garrilwara. It there has to cross the river Sukur, by a viaduct one hundred and seventy yards long. From the river Sukur it becomes a practically straight surface line, over a level country, as far as the three hundred and ninety-second mile, where it crosses the road to Katiotia, the termination of Section No. 6. By the tables of curves and gradients it appears that seventy-three miles out of eighty-seven are either level, or of first class gradients, and that sixty-five miles are straight.

The material for earthwork upon this section will be the alluvial soil of the valley: stone and lime for building purposes are procurable, generally, from the hills at a short distance to the south of the line; teak of large scantling, and other good woods, abound in the Shahpoor jungles, about thirty miles from the railway, along the Towah; and timber and other materials can be conveyed down the Nerbudda early in the season. This portion of the line passes about nine miles from Mowpani, at the outcrop of the Benar coal, of which there appears to be abundance in that district. It may, perhaps, be practicable to pass somewhat nearer to it; but from our last season's operations it did not seem advisable to lengthen the line for that purpose, because we should then have to encounter the Seta Rewa, which has scoured out a deep and broad channel in the plain, and its course as far as its junction with

the Sukur, near Garrilwara, which will have to be followed by the railway, is very tortuous. We have as yet made no survey for the purpose of ascertaining the extent and quality of the seams of coal; I recommend, however, that this should be done before the engineers leave that part of the country. Near Mowpani two seams of coal have been superficially opened out last season; but no shaft has been sunk, nor has any attempt been made to work the coal up to this time, although it has been frequently picked up in various places, and favourably reported upon. The stations upon it will probably be at Sohagpoor, Garrilwara, Babye, Seemny, Hutwas, Bunkerry, Kaislah, and Sehora.

Section No. 7 commences near Katiotia, at the three hundred and ninety-second mile, and crosses the river Baroorewa, about sixty yards wide, in the three hundred and ninety-fourth mile, with much broken ground on either side. At the three hundred and ninety-fifth mile it crosses on a level the Hoo-shungabad and Jubbulpore main road, and then passes close to Nursingpoor, the well known and important mart for the cotton and grain of this part of the country. After passing a small stream called the Singery, and recrossing the Hoo-shungabad and Jubbulpore road in the three hundred and ninety-seventh mile, the line continues of the most favourable character until it approaches within a mile of the Shair, where the ground is cut up by deep ravines. That river is crossed at the four hundred and fourth mile, where its width is one hundred and ninety yards: its banks are precipitous, and the extreme height of the flood has been known to reach sixty feet above the bed, although its ordinary level is about forty feet. From this point the railway runs generally upon the surface of a very even tract of country, as far as the four hundred and twenty-fourth mile, and presents nothing worthy of remark, except the crossings of two or three streams, with sandy beds, and soft crumbling banks. It then approaches the Nerbudda, and traverses some broken ground, much intersected by nullas. At the crossing of the Nerbudda, its banks are very high and precipitous, especially on the north side. The total width from bank to bank is four hundred and fourteen lineal yards. The flood of last year, the highest on record, rose ninety feet above the river bed, but subsided in an hour or two. The ordinary floods rise seventy-four feet. During the dry season, however, building operations may be carried on with facility, as the river contains very little water; and early in May, when our section was taken, the extent of dead water in it was only seventy-one yards wide, and its greatest depth only five feet.

The course of the Nerbudda was examined for thirty miles from Sukur, at the junction of the Huran, on the western side of the railway, to Beira Ghat on the east. Near the Beira Ghat the channel is much contracted, and runs through perpendicular rocks of white marble. The facilities which this circumstance would appear to offer could not be taken practical advantage of, because during the floods, the Nerbudda not only rises high above those rocks, but before entering the gorge finds for itself another wide channel through soft soil; and

added to this, a more serious objection was found to exist in the almost insurmountable difficulties of the country between Chindwara and the Beira Ghat.

The crossing of the Nerbudda which we have selected is near Jhansee Ghat, to the west of the ford of the Jubbulpore road. The viaduct will be three hundred and seventy-one yards long, and I estimate the cost of it for a double line of rails at £40,000. The bed of the river is rock, and I see no reason to expect that any important engineering difficulties or expensive contingencies will be met with in the execution of this large work. It is advisable, while the dimensions and probable cost of our crossing of the Nerbudda are under consideration, to draw your attention to that other crossing of it which has been contemplated near Broach. The spot which we have selected for bridging it is upwards of five hundred miles above the town of Broach; and along nearly the whole of that great distance the Nerbudda receives the immense drainage of the Vindhya and Satpoora ranges of mountains, for which a continuous water-way several miles in length must be provided. Moreover, at the proposed crossing, not only will the floods require an extent of bridging for which railway engineering practice affords no precedent, but the execution of the work within the channel of the river will be encumbered with difficulties and expense by the large body of water, twenty-eight feet deep, which it contains even at the lowest tides; by the ordinary tide, which rises ten feet, and is of unusual velocity near Broach; and by the enormous inundations, which rise about seventy feet above the bed of the river, and spread for miles over the country in one vast sheet of water, sometimes as much as ten feet deep. Whether the proposed crossing of the Nerbudda at Broach be judged of by analogy with ours near Jubbulpore, or whether the drainage of two ranges of mountains for nearly five hundred miles be taken as the measure of the work, its proportions must be extreme. The character of this most formidable projected work bears indirectly upon your interests, and cannot fail to affect in a most important degree the railway question now under the consideration of Government: I therefore request that I may be commissioned to report to you without delay upon the subject of the proposed railway crossings of the river Taptee at Surat, and of the Nerbudda at Broach, and to take the necessary steps for doing so in full detail.

After crossing the Nerbudda at the four hundred and twenty-sixth mile, the line traverses some rough ground and several nullas, for about a mile and a half, and then runs for twenty miles upon the surface of a level and even country; and at four hundred and forty-seven and a half miles reaches the Jubbulpore and Saugor road, at a distance of a mile and a half from Jubbulpore, where that part of the line upon which I now have the honour to report to you terminates.

The whole of the last fifty-five miles are of a favourable character in every respect; and if it were not for the crossings of the rivers Nerbudda and Shair, the cost of it would reach the very lowest limit. The soil is alluvial, the requisite materials are abundant; and the level crossings are few. The tables

of curves and gradients show forty-seven miles of practically level gradient, and forty-six miles of straight. The stations through this district will probably be at Nursingpoor, Jubbulpore, Peindry, Chindwara, and Kisrode.

. Our field operations last season extended to Gosulpoor, a distance of eighteen miles from Jubbulpore; but I shall make no further allusion to that part of the line in this Report, because it is liable to alteration when the ascent of the Vindhya is laid out.

Reviewing the whole of the north-eastern extension, from the top of the Thul Ghat to Jubbulpore, a distance of five hundred and twenty-two miles, the character of our line is unexceptionable, and its construction ought to be very cheap: the materials are good and abundant; the price of labour is low; and there are no engineering difficulties to be encountered upon it. * * *

The Indhyadree and Satpoora ranges, supposed to present such formidable obstacles to laying out a railway, are proved by our sections to be capable of being surmounted by a good working line, free from heavy works of any kind. Nearly its entire course traverses some of the most fertile and productive districts upon this side of India; for after clearing the Ghats it runs through the plain of the Godavery for fifty miles; crossing the Indhyadree range, it enters Khandesh, and passes through that province for one hundred and fifty miles, accommodating some of its most healthy and productive Talookas, and its principal cotton marts; then, passing the Satpooras, it ascends for two hundred and fifty miles the magnificent Valley of the Nerbudda, with its valuable coal and iron-fields, and its copious supply of grain, seeds, and cotton; and while it presents these commercial advantages, and affords this vast extent of local accommodation, it pursues a direct course for effecting the transpeninsular communication with Calcutta, and for connecting the province of Berar with the port of Bombay.

Sufficient returns of traffic have already been made to prove that a profitable revenue will accrue to your railway between Bombay and Eastern Khandesh; and beyond that it could hardly be expected that the amount of existing trade would be found sufficient to establish actual data for an equally profitable return; but there is throughout the Valley of the Nerbudda so great an abundance of marketable and exportable produce, which only awaits the opening of a quick and cheap communication to meet the demands both in this country and for export, that I believe no doubt can be entertained of the commercial success of that part of your undertaking, particularly when we regard the importance and extent of the commerce that must pass between Bombay and Calcutta, and to the great facilities of the country for the construction of a railway.

In many parts of the Nerbudda Valley coal exists, of undoubted quality, in great abundance, and lying in a most favourable position for being worked. Iron ore, too, abounds, especially on the north of the Nerbudda. The principal mines of the district are Tendukheira, about ten miles from our line, near Nursingpoor. They are now worked in the rudest fashion, but the iron produced is of excellent quality. There are furnaces also at Paneghur and Gosul-

poor, close to which our line passes; and although the iron is held inferior to that of Tendukheira, it is, I believe, good, and forms an article of export from those towns. Valuable iron mines also exist at Ponassa and Chandgur; and I find, from papers kindly furnished by Captain Erskine, Commissioner of the Saugor and Nerbudda Territories, that besides those which I have specified as the principal ones, and as lying near the course of our line, there are five mines within twenty miles of Jubbulpore.

I am not yet sufficiently informed to furnish you with a full statement of the present general traffic of the Nerbudda Valley; but I beg to append two returns from Captain Keatinge, Political Assistant in Nimar, one of which was kindly furnished to us by himself, and the other by Sir Robert Hamilton, through the Bombay Government. By these it appears that the quantity of goods sold in four bazars, and which passed four points in Nimar in the year 1853, amounted to 12,417 tons, of which the trade to Bombay is entirely the growth of five years, and is increasing rapidly.

The traffic on the Agra and Bombay road, taken at Akhaipoor for twelve months from April 1853, was as follows:—

Foot passengers	95,750
Bullocks and horses	21,229
Carts	18,087
Camels.....	2,415
Elephants.....	46
Buffaloes	938
Asses	293
Palanquins	121
Sheep and goats	964
Carriages	26

The return of traffic on the Boorhanpoor and Indore road, taken at Kherry Ghat for twelve months, from April 1853 to May 1854, gives—

Foot passengers	26,141
Palanquins	17
Sheep and goats	102

As well as the goods comprised in Captain Keatinge's statement of the Nimar traffic.

In addition to these, we are indebted to Mr. Williams, Overseer of the Schools of Industry at Jubbulpore, for the following statement of the annual trade to and from that station; and from his long residence there, and his knowledge of the commerce of the country, it may, I am sure, be safely relied upon.—

Cotton	8,571 tons.
Wheat.	4,285 „
Hemp, gum, ghee, iron, and other commodities	1,585 „
Hides.....	100,000 Nos.
Imports about	11,553 tons.

Making a total of upwards of 26,000 tons for the present trade for Jubbulpore.

In transcribing the results of these returns, I by no means intend to imply that this traffic properly belongs to our line between Bombay and Jubbulpore; but my purpose is to show, by reference to its present trade, that the district of the Nerbudda is likely to afford us a very large traffic. No statistical returns could present a correct estimate of the traffic that would be created, if the Nerbudda Valley possessed a railway communication with the ports of Calcutta and Bombay. It is now practically shut up; but the exports of coal, iron, cotton, wheat, hemp, linseed, timber, and other products, and the imports of salt and manufactured goods, must eventually become immense.

* * * * *

The estimates* have been framed upon my experience in the construction of our works, and upon accurate data, obtained by Mr. Graham, respecting the local prices and facilities of those districts through which this extension would pass. The prices of iron have been fixed at the high rates which we paid for our last supplies; and as the market has since risen, it may possibly happen that my estimates of the permanent way may fall short in that particular. My rates, however, are above the average, and the future turn of the market may therefore be in our favour. In any event, I beg to protect my estimates from this speculative contingency.

The cost of a single line of permanent way upon the several sections of this extension varies from £2,810 to £3,160 per mile, which is more than one-half of the total mileage cost of each section. As this large proportion arises chiefly from the high prices of the English iron materials, and from the great expense of conveying them from the port to the interior of the country, the expediency and advantage of establishing the means of providing a local supply of rails, chairs, spikes, &c. are clearly pointed out. Although great encouragement for the early establishment of ironworks exists in the valuable character of the mines, in the great and urgent demand for iron in this country, and in the fact that the high prices of English permanent way materials will be a serious and undue impediment to the cheap construction of railways through the interior of India, yet it is very doubtful whether the Nerbudda coal and iron-fields can be worked so expeditiously and economically as to afford us much benefit in the construction of the railway between Bombay and Khandesh. In fact, I am inclined to think that active and successful operations in that enterprise will be found to depend more upon the completion of a railway communication between Bombay and the Nerbudda Valley than the railway does upon a local supply of coal and iron.

* Of £6,380 and £6,178, as an average cost per mile. The estimates are omitted for brevity.—*Editor*.

EXTRACTS FROM A REPORT

(DATED THE 28TH APRIL 1851)

RELATING TO THE

MINERAL DISTRICTS, &c. OF THE NERBUDDA VALLEY;

ADDRESSED BY

LIEUTENANT COLONEL J. P. KENNEDY,

MANAGING DIRECTOR AND ENGINEER IN CHIEF, OF THE BOMBAY, BARODA, AND CENTRAL INDIA
RAILWAY COMPANY,

TO THE DIRECTORS OF THAT COMPANY:

WITH ACCOMPANYING REPORTS ON THE SAME SUBJECT,

BY MR. JACOB AND MR. GREEN.

EXTRACTS FROM REPORT

LIEUTENANT COLONEL J. P. KENNEDY.

* * * * *

The first question to be answered by a railway company in India is, how they are to bridge their rivers and nullas. This, accordingly, has been our chief subject of consideration. In reference to it, I have framed a comparative estimate* of the ordinary modes of executing a viaduct by the use of masonry or of iron; considering likewise whether the iron to be employed shall be of English or of Native Indian manufacture, provided the latter can be obtained. The present competition price of English iron having reached about double the first cost remunerative price under the former steady rates of wages, and the probable future demand upon the English market from foreign, colonial, and Indian railways in particular, make it probable that even the present high competition prices may still be largely increased, unless additional supplies can be produced elsewhere. Nor would a moderate increase of produce go far in keeping down the competition price contemporaneously with a very large increasing demand for that produce. No railway company, under such circumstances, could expect to obtain their iron at anything near to a fair remunerative price, unless by manufacturing it on their own account. A foundry opened in India by an ordinary speculator would have little effect, except as regards the question of freight, in reducing the price of iron to any particular railway company, beyond what an additional foundry of the same manufacturing power established in England would have; the price of its produce being regulated, as a matter of course, by the general rate of the market.

It was in this view of our case that I selected a Geologist to accompany our first Surveyors, and his attention has been devoted exclusively to the mineral districts of the Nerbudda in the vicinity of our line.

His efforts have been most successful, and his Reports† will be read with much interest. Mr. Jacob states the existence of a rich and inexhaustible

* Copy of which is given at pages 134 and 135.

† Copies of which, dated the 1st and 4th April 1854, will be found at pages 136 to 144.

supply of iron ore at Chandgur, with an ample quantity of lime and timber for charcoal in the immediate vicinity, as well as a first-rate quality of coking coal in large quantities, and easily obtained, at Benar, higher up the river. The ground between the coal and iron, and that between the proposed foundry and our general line, he states to be most favourable for railway construction, and situated in a rich traffic district.

By referring to Appendix No. III.,* we find from the comparative estimate, that if we construct our viaducts, rails, &c. of Native iron of our own manufacture, we may calculate on executing our railroad at an average rate of £3,999 per mile; that if we adopt the same principle of construction, but purchase our iron in the English or other market, we may calculate on expending £7,041 per mile; and if we use brickwork or masonry viaducts, with English iron rails, our outlay would be £8,717 per mile.

Hence, then, the very first preparation that I should earnestly recommend, to enable us to secure the most successful result in our future railway operations, would be the immediate establishment by our Company of a Native iron foundry.

I can have no hesitation in recommending that the site of such foundry shall be at, or near Ponassa, in the neighbourhood of what I believe to be the best iron district in India, the ore being as inexhaustible in its quantity as it is superior in quality. I am justified in recommending the adoption of this locality upon the authority of our Geologist, who has devoted much time to its examination, and comparison with other mineral districts, and who has tested its ores by repeated and careful analysis; and also upon the still more convincing fact that its ores have been manufactured from time immemorial, and continue to be manufactured extensively to the present day by the Natives, in their own rude, costly method, and that the metal they produce, the Chandgur iron, has always been considered of the very highest quality; that the situation of Ponassa is considered healthful; that there is the best quality of lime for our purpose in close proximity; that there is a very large supply of charcoal jungle in the neighbourhood; and that when that may fail, we have a first-rate quality of inexhaustible and easily worked coking coal, higher up the river, to depend upon for our fuel, the road to which would pass through a country favourable for railway construction, and a good traffic district.

Under these circumstances, I cannot hesitate to recommend the immediate establishment of an iron foundry at, or near Ponassa, as an indispensable essential to the fullest success of our railway operations.

The attention of one of our Engineers, Mr. Green, has been especially given to test the beds of the principal rivers. He was furnished with the appropriate boring tools for this purpose, having had considerable experience in the construction of viaducts such as we require. His examination of the

* Being Report by Mr. Jacob on the Mineral Districts of the Nerbudda Valley, a copy of which will be found at pages 136 to 144.

Taptee and Nerbudda justifies me in recommending* that those rivers should be bridged by an iron superstructure, supported on iron pile piers.

* * * * *

A line from Baroda to Indore would admit of extension eastward to connect with the Calcutta line at or near Allahabad, and it could throw off branches to the northward to any extent that the traffic of the district might require. This line commands, likewise, the power of giving an approach from the northward to the Nerbudda mineral district, by an extension branch along the Nerbudda north bank, from the point it reaches before entering the Vindhya Pass; and I believe it is impossible to overrate the beneficial consequences that the Nerbudda mineral district is calculated to produce in the industrial development of India, if properly dealt with.

* * * * *

My reason for not having executed a section of the line from Julgaum to the proposed Ponassa foundry, and thence to the Benar coal-field is, that being quite satisfied with the Report of Mr. Jacob, together with my own observations as to the facility of constructing a good line through that district, when I went to put a party to take the section, I found the engineers of another company already occupied in the same work, and it appeared quite superfluous that a duplicate section should be taken by me, when so much important information was wanting on other districts; I therefore placed my party elsewhere. The information furnished by the other company will be no doubt ample to enable the Government to come to a decision on all matters relating to the district in this respect.

* Vide Mr. Green's Report, at pages 114 and 145.

ESTIMATE BY LIEUTENANT COLONEL KENNEDY,

ALLUDED TO AT THE COMMENCEMENT OF THE FOREGOING EXTRACTS.

A Comparative View of the proximate Cost of Constructing an average Mile of Single Truck Railway by each of Three Methods of making the required Viaducts and Bridges, viz. 1st, by using Masonry or Brickwork; 2nd, by using English Iron; 3rd, by using Native Iron. The Embankments are assumed to average 9 feet in height to Formation Level. Average Length of Viaducts or Bridges per Mile 1-27th of the entire.

Detail of Works.	Quantities per Mile.	Estimate per Mile, supposing Viaducts and Bridges to be of					
		Masonry or Brickwork, and English Rails.		English Iron.		Native Iron.	
		Rate per	Amount.	Rate per	Amount.	Rate per	Amount.
		£ s. d.	£	£ s. d.	£	£ s. d.	£
Surveying expenses .. .. .	..	..	30	..	30	..	30
Law costs .. .. .	..	..	5	..	5	..	5
Land .. .. .	..	..	..	..	..	..	..
Fencing with growing plants .. .. .	..	..	10	..	10	..	10
Earthworks	c. yds.	0 0 1½	363	0 0 1½	363	0 0 1½	363
Rock-cuttings	58,080	0 1 0	500	0 1 0	500	0 1 0	500
Bridges and viaducts	10,000	60 0 0	3,800	36 0 0	2,304	9 0 0	576
Ballasting, 18 inches deep	lin. yds. 64	0 2 6	565	0 2 6	565	0 2 6	565
Iron rails, sidings, switches, &c., 80 lbs. per yd. ..	c. yds.	12 0 0	1,584	12 0 0	1,584	5 0 0	660
Cast-iron sleepers	4,620	6 0 0	780	6 0 0	780	3 0 0	390
Laying permanent way, per lineal yard	Tons.	0 0 8	58	0 0 8	58	0 0 8	58
Station-houses, 1 to every 5 miles, at £150 each ..	130	..	30	..	30	..	30
Terminals and workshops .. .. .	..	..	50	..	50	..	50

(APPENDIX No. III.)

*Report on the Iron and Coal Districts of the Nerbudda Valley, from Ponassa to Jubbulpore.**Surat, April 1st, 1854.*

From Mr. A. A. JACOB, B.A.,

Asst. Engr., and Geologist to the B. B. and C. I. R. Co.,

To Lieutenant Colonel J. P. KENNEDY,

Engineer in Chief and Managing Director, Surat.

SIR,

I have the honour to lay before you a summary of the reports and observations which I have forwarded at various times, during the five months that I have been employed in the examination of the Nerbudda mineral districts.

According to my instructions, I proceeded to join Mr. Keatinge, the chief British functionary of the principal mineral districts, whom I found in camp at Asseerghur, on the 19th November last; and, acting under his advice, I proceeded to Kautkot, on the north bank of the river Nerbudda, where I arrived on the 30th November.

My attention was here directed to the iron mines belonging to Holkar, situate about four miles from the village, in the dense jungle. They were in a fearfully dangerous state, no regard being paid to the workings, the aim of the people being to extract the greatest quantity of ore without the least regard to future workings. The ore is the hydrated peroxide of iron (ochreous variety), yielding by dry assay 37.22 per cent. of iron, which may be considered as a high per-centage.

The most primitive form of Catalan forge is used by the few poor people who earn a livelihood by the manufacture of iron. A description of their furnace may not be amiss.

It is in height from three to four feet, the top section twenty inches by ten inches, and the bottom twenty-three inches by twenty-two inches. In the base of the furnace is inserted a flat earthen plate, with several indentations, which are, during the smelting, pierced for the outflow of the slag. The blast is supplied through very fusible earthen pipes by goatskins plied alternately. When these earthen pipes are burned away, the iron is finished. This process occupies about ten hours. The base of the furnace is then broken out, the lump of iron extracted, and beaten with hammers to remove the slag; the defective apparatus used obliging them to re-heat the iron five times.

I hired one of these furnaces, to find what amount of iron could be extracted. I allowed the men to work in their usual method, only taking the ore and coal

from heaps which I had carefully weighed. The following is the result of my investigation :—25 seers of iron ore consumed 26 seers of charcoal, and furnished 5.61 seers of iron (and this not in a marketable condition); thus giving 22.84 per cent. of iron; 104 per cent. of charcoal being consumed in the process, or at the rate of 4 tons 12 cwt. of charcoal per ton of iron.

A proper furnace, with this ore, could not, under the most unfavourable circumstances, consume more than 220 bushels of charcoal to the ton of iron; and taking the bushel to be 9.75 lbs., the amount of charcoal to a ton of iron would be 2,145 lbs., or 95 lbs. less than one ton, being about 4.8 times less than the quantity required by the above furnace.

The above per-centage of iron appears small when compared with my assay; but it must be remembered, that as no flux is used, every pound weight of silix will absorb and convert into slag 3 lbs. weight of iron.

Each furnace has three men attached to it, who dig out the ore in the first place, next cut their timber, and burn their charcoal, then draw the ore and coal to the village, set up their furnace, and smelt their iron. During this time they must run an account with the Bunnia (or Native merchant), and such account he manages shall swallow up the produce of their labour.

The cost of manufacture is as follows :—The ore purchased at the mines comes to 84 tokrees the rupee. I found 1 tokree to contain 12 lbs. nearly, the ore coming in round numbers to 4s. 6d. per ton nearly. Three men working at one furnace are able to make 24 lbs. of iron per day; it therefore requires 280 men to one ton of iron, by their rude process: then—

	£	s.	d.
4 tons 12 cwt. of charcoal, with 8 cwt. for waste, at 9s. 4d.	2	6	8
4½ tons of iron ore, at 4s. 6d.	1	0	3
Labour, 280 men, at 2 annās (3d.) per day each	3	10	0

£6 16 11

The Bunnia's price for the iron is £7 15s. per ton, leaving him, as above, 18s. profit per ton.

As an illustration of an improvement in the manufacture of iron, even in these rough forges at Tendukheira (to be described further on), where the people are rendered industrious by having a greedy and ready market for their iron, any amount may be had for 20 seers the Nagpore rupee, or £4 16s. per ton nearly, notwithstanding that they bring their charcoal from a distance of 12 gond kos, or fully 36 miles. Yet, because they distribute their labour, and keep their little furnace in regular work, they are able to give iron at the above low price, and hundreds of tons are annually sent out through the country for consumption. Their charcoal only costs them 5s. 6d. per ton at the furnace; and yet the Lower Nerbudda workmen, with the timber on the spot, will charge 9s. 6d. per ton—their coalings are so very defective.

From Kautkot I went to Burwayee on the Nerbudda. Here is a large mine of the same ore as last, but more silicious.

As I consider the Ponassa and the Chandgur districts of by far the greatest commercial importance, I will not say more of the intervening country.

I arrived at Ponassa on the 12th of December, and examined a large deposit of dolomite (carbonate of lime and magnesia), which exists there, about two miles west of the town.

The deposit is, practically speaking, quite inexhaustible, the outcrop being four miles in length: the stone, for a flux, is superior to pure limestone, magnesia being a much more powerful base than lime. It is also well adapted to lithographic purposes.

From Ponassa I went to Chandgur, where the red hematite ore of iron abounds. It is of surpassing richness, yielding 63.4 per cent., the theoretically pure ore giving only 69.34 per cent.

At one of the mines (that marked as Upper Chandgur on plan), the ore lies in rounded nodules on the surface, the depth varying from six inches to ten feet. It is dug out by the people with the greatest facility.

This friable deposit is the result of the disintegration of the metalliferous rock beneath. I have verified this by direct observation, having laid bare several veins, by cutting trenches down on them.

In addition to the above loose ore, the ground for hundreds of acres is strewn with it, and every stream runs down quantities of the purest kind, the débris from the various veins intersected in their course.

The river Nerbudda cuts four great veins within the short space of one mile, one of them having a breadth of one hundred and twenty-two feet. The veins run almost vertically into either bank.

At Makeraban, on the river Towa, two miles from its junction with the Nerbudda, is another friable deposit; but its quality is not so good as that on the north side of the river. It is needless to dwell on the many places in the district where iron ore abounds;—the deposit may be looked upon as inexhaustible. Since I left Ponassa, Mr. Keatinge wished to find a mine close to the town, in order to employ the prisoners in the manufacture of iron, and having offered a reward of Rs. 25, he was shown two mines, which I have since examined. One of them is of much value.

Your superintendent, when he would be stationed in the district, would have no difficulty in laying bare deposits in addition to the very numerous ones which are at present known.

The loose ore, which ought to be the first used, would be collected by the people of the neighbourhood. Allowing the liberal price of 4 pies per tokree, the ore would be placed at the depots at the low price of 1s. 3½d. per ton. My camp was four miles from the mine, and yet the villagers offered to bring any quantity to it for that price.

The district for miles round is dense jungle; the timber is of the highest specific gravity, including undian and stunted teak; it is admirably suited to the manufacture of charcoal; and the supply will last for very many years.

Yet it is well to know that a cheap communication can be opened with the

inexhaustible coal-measures of Hooshungabad and Nursingpoor (to be hereafter described), and that a line joining the coal with the iron mines would pass through a district of the most extraordinary fertility (vide Supplementary Report). I consider that, with proper coalings, charcoal cannot possibly cost more than 4s. per ton.

I would furnish you with an appropriate estimate of the expense of manufacturing iron at Ponassa with proper apparatus, but I consider that the fact that the inhabitants of Tendukheira manufacture malleable iron for £4 16s. per ton, under much less favourable circumstances, consuming more than four times the requisite quantity of fuel, to be much more valuable than any estimate I could give.

Ponassa I would recommend as the proper site for an iron manufactory : it possesses the following advantages :—

1st.—It is on British territory.

2nd.—The soil about it is most fertile, the place healthy, and abundantly supplied with water at all seasons.

3rd.—It is most conveniently situated with regard to trade; the country around it flat; and should a line from the Taptee Valley branch to Jubbulpore be deemed advisable, it would pass in the vicinity; and the dolomite basin is close by.

The north bank of the river is foreign territory, and very barren; besides, the dense jungle would render it most unhealthy.

Your ore banks and mines would be ten miles distant from your works; but a proper road to them would enable you to draw the ore very cheaply, and the road being through jungle, your coalings would be along it.

One circumstance vastly in favour of these mines is, that no shaft or pumps would at any time be required, as the great veins can all be worked and drained by adits.

Baraj Sing, one of Sindia's petty Rajas, is owner of the mines and forests on the north side of the river, and he derives a small income from them of about £10 annually.

Kurrock Sing is owner of the royalty at the south side of the river, and he derives a small income of about £3; but I am informed by the Commissioner of the Saugor and Nerbudda Territories, that the Government will, in the approaching settlement, reserve all mines for their use.

With these men, negotiations for purchase should be opened.

Leaving this iron district, I proceeded to the coal-field, which I entered above Sewnee.

At Sonadeh, several thin seams of coal outcrop, which, though of little value, are sufficiently indicative of a rich mine beneath; and I have no doubt but that a few deep borings would be attended with the most successful results.

Here an abundance of fine fire-clay is to be had,—a substance essential in the construction of your furnaces.

The probable available coal-measure here will be about fifteen miles long, by seven miles wide.

From Sonadeh I proceeded to Benar, in the Nursingpoor district, eight miles to the south of Garrilwara. Here are three workable seams, the top-most being eight feet thick where I measured it; but as the strata were there injured, it will probably reach ten feet.

The next seam is three feet six inches; and below it another seam, six feet three inches.

As these are only separated by laminated shale of one foot four inches, both seams could be wrought as one, giving an available seam of nine feet nine inches: thus about nineteen feet of coal could be worked from one shaft, the intervening rock being only about twenty feet.

The beds are highly inclined, owing to the occurrence of trachytic veins higher up the stream; but they will present no extraordinary difficulty in working.

It is highly bituminous lignite, containing little sulphur, and leaving but a small residue on incineration.

Colonel Ouseley, in the Journal of the Asiatic Society of Bengal, states that this coal was tried on the *Indus* steamer at Bombay, where one hundred maunds did the same work as one hundred and eighty-three of the best Glasgow coal, heating one of the boilers fifteen minutes sooner than the Scotch coal.

I carefully experimented upon the coal, and found that one hundred parts gave 66.88 of coke; an average of eleven specimens of coal from the various Newcastle collieries giving 60.77, and eight specimens from the Scotch collieries giving a mean of 54.23.

These seams are available throughout a large tract of country, and were a coast communication once opened, numerous other mines might be wrought throughout this great coal formation.

That such mines, discovered so far back as 1837, should still be untouched, speaks volumes for the state of communication through the country.

Leaving Benar, I went northward, to examine the iron mines of Tendukheira. They are situated about six miles from the Nerbudda, in a highly cultivated district.

As I before alluded to the smelting of the ore, I will confine my remarks to the mines themselves.

The ore is found beneath the surface, at depths varying from fifteen to fifty feet: the pits are so carelessly made, that they require to be re-dug every cold season, the monsoon rains quite filling them with the earth washed in.

The ore is extracted in quite as careless a manner as at Kautkot: the shaft is ascended and descended by huge steps, cut in the clay; and though now accustomed to the various rude expedients made use of by the Natives, I was hardly prepared for the ludicrous method by which the ore is brought to the surface. A woman seats herself at the base of the shaft, and then commences throwing up the lumps of ore to step No. 1 (about three feet high);

when this step is so covered with ore that she can but just find sitting room on it, she climbs up, repeats the process, till the ore is brought to the surface; it is then placed in baskets, and carried by buffaloes to the town, three miles distant, to be smelted. I confess I was much disappointed with the ore deposit, after seeing the vast quantities of iron sent out through the district round. Though very fine red hematite ore, it is vastly inferior to the Ponassa iron, both in quantity, quality, and in the facility afforded to the working.

It may appear strange that this rude method of extracting the ore should be accompanied by such a neat and systematic method of smelting; but I attribute the latter to Captain Franklin's exertions, who was sent there some years since by Government; while in the former case I presume his improvements (if such be adopted) must have lapsed into disuse. At all events, the great demand for the iron through the surrounding agricultural districts has given a stimulus to the trade, while the increased competition amongst producers has reduced the price of the manufactured article.

Leaving Tendukheira, I proceeded to examine the Jubbulpore district. Here I found large and rich deposits of the micaceous variety of specular iron. It is extensively wrought, holding the same price and position in the market as the iron of Tendukheira, the principal seat of manufacture being Penaghur, fifteen miles north-east of Jubbulpore.

At Betharee Ghat, the Nerbudda cuts a large coal seam; but it is highly pyritous, and the strata, being inclined at an angle of eighty degrees, is unconformably overlain by dolomite. The difficulties presented to working the seam render it probable that no use will ever be made of it.

I here found unmistakeable evidence of the presence of copper, but was unable to discover the lode.

A fine statuary marble is found lower down the Nerbudda, and the whole district is of the greatest interest, as well to the capitalist as to the geologist.

I have, &c.

(Signed) ARTHUR A. JACOB, B.A.,
Assist. Engr., and Geologist to the B. B. & C. I. R. Co.

Report by Mr. JACOB, in reference to the Line required to open up the Mineral Districts of the Nerbudda Valley.

Surat, April 4th, 1854.

To Lieutenant Colonel J. P. KENNEDY,

Engineer in Chief, and Managing Director.

SIR,

Having sent in my Report on the Mineral Districts of the Valley of the Nerbudda, I now beg to lay before you the result of my examination of the

physical features of the country with reference to the levels, &c., in order that you may from it form a correct idea of the best means of dispersing not only the mineral but the agricultural produce of these territories throughout India.

Aware of your intention of opening out the Valley of the Taptee, I will speak first of the junction between Julgaum and Ponassa, the proposed site for your ironworks; secondly, I will shortly refer to the line of country between Ponassa and Mundlairsir, with regard to the opening out of the Lower Nerbudda Valley; and finally, I will describe the line of country between Ponassa and Jubbulpore, with a view to the connection of the iron districts with the coal basins eastward, and to the affording of an outlet for the enormous grain and other produce of the valley, a large portion of which constantly rots for want of means of communication by which it could be brought to market. This line may also be considered as a portion of the connecting link between your main line and the Calcutta railway.

From Julgaum to Boorhanpoor is, as far as I could observe, a comparatively easy country: good gradients can, I am of opinion, be had all through it.

Boorhanpoor is a large, wealthy, and populous city.

The main question to be settled, on a minute examination, will be the precise point for passing the Taptee.

Proceeding then north-east, Asseerghur should be passed at a few miles east of the fort, where the Satpoora range is much broken, and affords an easy passage. Thence to Peepleod, a distance of fifteen miles, no difficulty will be found of any moment, and the country becomes more fertile. Twenty-one miles further on the branch to your ironworks would probably join, turning off toward Moondec, and crossing the Towa on a fine rocky bottom, without any difficulty. This branch would be about sixteen miles in length, and probably its extension across the Nerbudda to Indore will be a matter of future consideration, opening out, as it would, the great iron country further from Ponassa.

At Sakur, where it would probably cross the Nerbudda, the fine-weather breadth of the river is but forty-eight feet; and I do not hesitate to say that it affords the best site for a bridge throughout the two hundred and eighty miles of that river which I have examined, save, perhaps, Jhansee Ghat, near Jubbulpore (to be described further on).

The line of country from Ponassa to Mundlairsir (about forty-eight miles), presents easy gradients; no difficult rivers are crossed, and Burwayee, a fine town half-way, would afford considerable traffic.

The Nerbudda line, after passing the Ponassa junction, should diverge in a straight line to Hurda, a further distance of twenty-eight miles. Here is the commencement of a district of endless fertility and unknown wealth; and, if the little ravines on the edges of the very few nullas to be met be excepted, the country may be considered level.

Hurda is a large town, carrying on a flourishing trade, as far as the wretched communications of the country will admit. It sends down quantities of cotton every season to Bombay. I am informed by Mr. Keatinge, the Political

Agent of Nimar, that cotton carts passed Asseerghur during the last season at the rate of two hundred per day.

Crossing the Gungal river at a distance of eighteen miles, Sewnee will be reached seven miles and a half further on.

This is, again, a fine business town.

I would not recommend a divergence from the straight line toward Hooshungabad, as that town, though large, would not, I think, have sufficient traffic to authorise such divergence; and the river Towa, a troublesome stream, would near Hooshungabad be passed with much difficulty. It would be better to continue straight to Patroda: the line would pass near the Sonadeh coal-field (see Geological Report), and it is probable that valuable coal mines will be found between Sewnee and Patroda.

At Patroda the Hooshungabad road is crossed. Quantities of opium will here be taken up from the Baitool district, and abundance of teak timber of fine scantling can be had in the hills south of the line.

From Patroda to Sohagpoor is about twenty miles, the Towa river being passed half-way. This is the first troublesome river to be passed; the bed is deep sand, and about three quarters of a mile wide.

Keeping above the town of Sohagpoor, the line would still pass through a most fertile and populous country for fifty miles, where the Benar coal mine would be reached (vide Geological Report).

Garrilwara is about twelve miles north of the coal mine: it is a fine populous town. From this to Nursingpoor is twenty-three miles: this is another large town.

From Nursingpoor to Jhansee will be twenty-seven miles: the line, passing under the hills, would cross the Nerbudda at Jhansee Ghat, where a fine site for a bridge is to be obtained about five hundred yards below the Jubbulpore road.

The river is about six hundred feet wide, and fordable; the banks high; the bottom is a fine flat-bedded sandstone, nearly horizontal; and should timber be required for centering or superstructure, the finest teak can be floated down from the Jubbulpore jungle.

There will be no ravines crossed on the south bank of the Nerbudda, as the line will run along a strip of high land between two tributaries; but on the north bank they will be troublesome for the first half mile.

Twenty-three miles from this, Jubbulpore will be reached without the least difficulty.

The lateness of the season prevented me from continuing my examination toward the Ganges.

Throughout this whole line, no gradient, I am convinced, will exceed sixteen feet to the mile, and the only gradients coming at all near this are those in the vicinity of Asseerghur.

As a practical proof of the cheapness of provisions of every kind, I was enabled, while about the Hooshungabad and Nursingpoor districts, to feed

three ponies and myself for the small sum of Rs. 23 per month ; and I did not act ungenerously either to myself or them.

The land bears two crops per year, without manure. After the monsoon, jowarec, bajrec, &c. are sown, and they being removed in November, wheat, gram, linseed, &c. are sown.

The demand is so small for the grain, that it lies in deep holes in the ground for years, and frequently rots there.

Wheat may be had for 90 seers the rupee, and gram for 120 seers the rupee.

Sugar is largely sent from Mirzapore westward, and salt, English and other goods, are carried eastward.

In Jubbulpore, lac is largely manufactured for the English market ; and, as I have stated in my Geological Report, its mineral resources must make it a place of vast commercial importance.

I have, &c.

(Signed) ARTHUR A. JACOB, B.A.,
Assist. Engr., and Geologist to the B. B. & C. I. R. Co.

Report on the Nerbudda River by Mr. J. T. GREEN, First Assistant Engineer to the Bombay, Baroda, and Central India Railway Company.

Banks.—The north bank, east and west of Broach, is high and precipitous, showing evident indications of the encroachment of the river during the period of floods ; and by information obtained from the inhabitants, this wearing away is to the extent of thirty feet in a period of twenty years. The upper stratum of this bank is black earth, three to four feet thick, under which are alternate layers of sand and clay, varying from two to eight feet thick, mixed with kunkur (specimen forwarded); twelve feet from the bed of the river, the clay becomes hard and tenacious, and appears to resist the action of the flood very considerably.

The south bank is low and shelving, about twenty-one feet above the summer level of the river ; the upper stratum alluvial deposit of earth and sand, in parts cultivated, and in others covered with low jungle, extending a distance of more than a mile, to a former channel of the river, when the bank again rises abruptly.

Floods are of two descriptions,—those occurring annually, during the periodical rains ; and rapid freshes at the same season, owing, probably, to the combined influence of a heavy fall of rain, a strong westerly wind, and high spring tides.

The highest known rise of flood took place seventeen years since, by the account of the inhabitants, and appears to correspond with the great flood

mentioned in the Report of the Taptee river, namely in the month of August 1837. The country in the vicinity of the river is spoken of as being entirely under water, except solitary knolls, upon which human beings and cattle congregated. This inundation, similar to the Taptee river, took a period of three days to attain its greatest height, and subsided in one, remaining nearly stationary twenty-four hours. With regard to the extent of country which was flooded, no positive information can be obtained; there is a prevalent report that the waters of the Taptee and Nerbudda joined, which, if true, would make it about forty miles.

Large quantities of drift timber, and grass, bushes, tops of houses, and cattle, are brought down during the period of periodical floods, and which is considerably increased upon a sudden rise in the river: tigers, bears, and several descriptions of deer, are also frequently brought down, together with a large number of snakes.

The nature of the deposit, after the floods have subsided, is alternate layers of sand and clay, as regularly as if deposited by human aid. Some of the layers vary in thickness, owing to the freshes being less at one time than another.

Velocity of Current.—The velocity was observed when the river was free from tidal water, and at summer level: the mean of three observations gives 1.23 feet per second, or 4,428 feet per hour,—less than one mile.

Borings have been made in four places,—one on the north side, between high and low-water, one in the centre of the river, and two on the south side. A reference to the accompanying section will explain the different strata penetrated: no stones, gravel, or pebbles were met with on the north side,—the clay is very tenacious; the sand and gravel found in the centre boring is compact and firm; that on the south side becomes firm after the first ten feet is passed through; and I have no hesitation in stating that screws of four feet flange will both enter the different strata with facility, and at a depth of twenty feet be found to afford a good and sufficient support for any structure.

The drift timber brought down in inundations is of considerable size and quantity; and on this account I would beg to suggest that the water may be left as wide as possible,—a span of eighty feet would not, I conceive, be more than sufficient. The number and size of piles used in each pier will of course be regulated by the span decided upon, and consequent weight to be borne by such pier. Cylindrical tubular piles of wrought-iron, with screws of four feet flange, will, I believe, be found the best adapted for piers in both the Taptee and Nerbudda rivers,—the modification to be made in the screws used in the former, as described in the Report thereon.

(Signed) J. T. GREEN,
First Assistant Engineer.

Surat, 4th April 1854.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. XVIII.—NEW SERIES.

OFFICIAL CORRESPONDENCE

RELATIVE TO THE

INTRODUCTION OF A ROUGH SURVEY

AND

REVENUE SETTLEMENT

IN THE

PROVINCE OF SIND.



B o m b a y :

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1855.

CONTENTS.

	PAGE
Resolution of Government, No. 1932 of 1855, passed under date 8th May 1855, on letters from the Commissioner in Sind, relative to the introduction of a Revenue Survey and Settlement in that Province	1
Letter from H. B. E. Frere, Esq., Commissioner in Sind, to Government, submitting copies of instructions which he had addressed to the Collectors on the subject of a Rough Survey and Settlement, and pointing out the preliminary arrangements which he thought necessary ; and enclosing correspondence on the subject	3
No. 1.—Circular (No. 34 of 1855) to the Collectors in Sind, forwarding copy of Rules for a Rough Survey	8
No. 2.—Memo. of Rules for a Rough Survey and Settlement in Sind.	9
No. 3.—Letter No. 33 of 1851, from Captain T. R. Stewart, Collector, Upper Sind, to the address of the Commissioner in Sind, with Enclosure No. 325 of 1853, from Lieutenant R. Cowpar, Deputy Collector, to the Commissioner.	24
No. 4.—Reply to the above letter, No. 1034 of 1851, from the Commissioner to the Collector of Shikarpoor	37
No. 5.—Statement showing the Extent of Cultivated Land in the Shikarpoor Collectorate in 1852-53	41
No. 6.—Report by the Collector, Upper Sind, on the Assessment of the Shikarpoor Collectorate, No. 402 of 1854.	45
Report from Lieutenant Lewis Pelly, Deputy Collector Left Bank, to the Collector, Upper Sind, No. 306 of 1851, with Appendices A, B, C	50
No. 7.—Letter No. 3374 of 1854, from the Commissioner to the Collector, in reply	79
No. 8.—Reply of the Collector, No. 468 of 1854, enclosing a Notification and Draft of Rules on the subject of Leases, and a further communication from Lieutenant Pelly, No. 347 of 1854	80
No. 9.—Reply from the Commissioner to the Collector, Upper Sind, No. 146 of 1855	93
Five Statements of Cultivation, &c. in the Larkhana Deputy Collectorate	97
No. 10.—Letter from the Collector, Upper Sind, forwarding Reports from Lieutenant Wallace, Deputy Collector of Shikarpoor, and Lieutenant Bird, Deputy Collector of Larkhana, in reference to their respective Districts.	110
Letter No. 339 of 1854, from the Deputy Collector, Shikarpoor District, to the Collector, Upper Sind, with Statements appended	111

	PAGE
Letter No. 417 of 1854, from the Deputy Collector, Larkhanga, to the Collector, Upper Sind (Statements are given at p. 97)	120
No. 11.—Reply from the Commissioner to the Collector, Upper Sind, No. 3 of 1855	124
No. 12.—Memo. on the Revenue Settlements in Sind, by Mr. A. Young, Deputy Collector, with Diagrams Nos. 1 and 2	125
Further Report from the Commissioner in Sind to Government, on the arrangements for carrying out the Preliminary Revision of the Assessment (No. 63 of 1855)	144

SURVEY AND SETTLEMENT IN SIND.

No. 1932 of 1855.

TERRITORIAL DEPARTMENT,
REVENUE.

TO THE COMMISSIONER IN SIND.

Copy of the Resolution passed by Government, under date 8th May 1855, on Letters as per margin, from the Commissioner in Sind, relative to the introduction of a Revenue Survey and Settlement in that Province.

<i>No. 20, dated the 12th January 1855, with Accompaniments.</i>	
<i>No. 63, dated the 12th February 185</i>	

With his letter No. 20, of the 12th January 1855, Mr. Frere submits copies of the instructions he has issued to the Collectors for a rough Survey and Settlement in Sind—"such," he says, "as may furnish the details which will not be given by a scientific Topographical Survey (a most necessary operation, which will, I hope, be undertaken by competent Officers at the earliest possible period), and, at the same time, furnish the data indispensable to a rough Revenue Settlement."

2. In urging the pressing necessity for the measures now proposed by him, Mr. Frere contrasts the great uncertainty almost universally prevailing throughout Sind, at the accession of the British Government, on all matters connected with the definition of district and village boundaries, with the exact and precise information on these points invariably accessible in other parts of India; and graphically describes the long succession of political disturbances and internal misgovernment, under which the confusion in which we found all the territorial and revenue divisions of the province had been generated. He doubts whether there is to be found even a correct list of the villages of more than half a dozen of the 66 Kardarates into which the province is at present divided. The measures now reported have been adopted with the view of providing a remedy for this state of things.

3. Those measures are described in paragraphs 17 to 25 of Mr. Frere's Report, and they are approved and confirmed by Government.

4. The only present extra charge for European superintendence will consist of the pay and allowances granted to the Supernumerary Deputies, who only receive Rs. 500 (to be reduced prospectively to Rs. 400), and travelling allowance when in the districts.

5. Government will be prepared to appoint any Officer who may be selected by the Commissioner, and whose services are available to the office of Superintendent. (See paragraph 22.)

6. The Rules drawn out by the Commissioner for the guidance of the Officers engaged in the rough Survey and Settlement projected by him seem eminently judicious, and well adapted for the important objects to which they are directed.

7. The Commissioner to be requested to state how long, in his opinion, it is likely to be, before the inquiries he has now set on foot will be completed.

8. In his letter No. 63, of the 12th February 1855, Mr. Frere has suggested the agency by which he proposes to carry out the measures above adverted to. The arrangements therein proposed differ slightly from those sketched in his former letter of 12th January, No. 20. The selection he has made of Officers for the performance of these very important duties appears judicious, and His Lordship in Council sanctions the whole of Mr. Frere's propositions, as contained in his letter of the 12th February 1855.

9. These proceedings to be reported to the Honorable Court, and the papers connected with them printed for circulation among the Officers employed in carrying out the contemplated measures. They should also be published as a portion of the Revenue Selections.

W. HART,
Secretary to Government.

No. 20 of 1855.

REVENUE DEPARTMENT.

From THE COMMISSIONER IN SIND,
To THE RIGHT HONORABLE LORD ELPHINSTONE, G.C.H.,
Governor, and President in Council, Bombay.

Dated 12th January 1855.

MY LORD,

I have the honour to submit, as per margin, copies of the instructions I have issued to the Collectors, for a rough Survey and Settlement, such as may furnish the details which will not be given by a scientific Topographical Survey, (a most necessary operation, which will, I hope, be undertaken by competent Officers, at the earliest possible period), and at the same time furnish the data indispensable to a rough Revenue Settlement.

Instructions to Collectors for a Rough Survey and Settlement in Sind, No. 34, dated 4th instant, with Enclosures.

2. It must be borne in mind that, as is shown more in detail in my letter No. 857, dated 21st May 1851, to Government—Report of the Commissioner's Tour of 1851. noted in the margin, Sind is very differently situated from any of our older possessions, and even from most of our recent acquisitions, in this respect.

3. As stated in my Memorandum, there is at present no complete survey or plan of any single district in Sind. The lithographed maps of Collectorates compiled by the Quarter Master General's Department from the Records of the Sind Survey Department have been most useful; but they are framed from confessedly very incomplete data. The boundaries of no single Collectorate are accurately laid down; few of the Purgunna boundaries, or of the canals, are perfect; there is no attempt to mark village boundaries, and the greater portion of each Collectorate is a blank, and has not been filled in at all.

4. There is no single Purgunna, nor even a village, of which there is an accurate plan, on a scale to be useful for fiscal purposes; except in the Thurr and Parkur district, there is not even such a list of the estates or fields, in any single village, as is to be found of almost every village in our older provinces. I doubt whether there be a tolerably correct list of even the villages of more than half a dozen of the 66 districts (Kardarates) into which the province is divided.

5. In this respect, Sind is far worse off than most of our recent acquisitions. An Officer appointed to the charge of a newly acquired district, in the Deccan for instance, would probably, on taking charge, call on the District Officers, stipendiary or hereditary, whoever might first meet him, for a list of Purgunnas,

showing the names of all the villages in each. He might call on a dozen such Officers in succession, and some from memory, some from written lists on their records, would all give him complete and accurate lists of the Purgunnas and villages with which they might be respectively concerned; and such lists would form the usual and necessary basis for all subsequent revenue arrangements and settlements, whether it might be decided to settle the territory by whole districts at a time, or by villages, or by individual estates, or by fields.

6. But nothing of the kind is to be got in Sind. The village boundaries existed here, as everywhere else in India; and wherever there are any fixed cultivating inhabitants left in the country, such boundaries are well known to them, and can be readily pointed out. But, for some generations past, their existence has been practically ignored by the Government Officers, and the only divisions used by or known to them, have been such as are subject to constant alteration.

7. Since Nadir Shah's time, the province has not had a single ten years of what could, even in India, be called a settled government. The Kulloras would, as rulers, rank low by the side of the least civilized of modern Native powers. Yet their administration is now looked back to by the people as paternal, compared with the clumsy barbarism of the Talpoors. From their first accession, six Talpoor Meers ruled concurrently, each with sovereign authority in his own share of the land. At the same time, several relations, great feudatories, and almost independent heads of tribes, exercised nearly equal powers. As the reigning families multiplied, each successive generation added to the number of generally illiterate, and, with a few exceptions, ignorant and incompetent rulers; they disputed, and sometimes fought and conquered from one another; they exchanged, they divided and sub-divided, they assigned, resumed and changed, the jagheers with which they paid for every service, civil or military; and each grant was, for the time, a recognized territorial division. If a district were peculiarly fertile, it became an object of strife, and often of ultimate division: each sharer, unable to get his fellow to give water from his canal, would frequently make a new one for himself, and the lands watered from each canal became a new division. Add to this the necessary tendency to movement and fluctuation of the population in any country where cultivation depends on canals, and where the canals, if not carefully looked after, will flood a district one year, and leave it dry and barren the next, and some idea may be formed of the kind of confusion which existed in all revenue and territorial divisions, at the downfall of the Talpoors.

8. When our Collectors first took charge, none of them had any previous revenue experience. The existence of any divisions analogous to those of villages in India seems not to have been suspected, and if known, was not in any way valued or attended to. Whatever divisions happened to be in use at the time were adopted, and as their inconvenience became apparent, they were from time to time changed, without any attempt at permanency. Even the number of the larger divisions or Kardarates, answering to Talookas or

Tehsildarees in India, was not always fixed. They were from time to time divided or united; they had rarely fixed boundaries or head-quarter stations, offices or establishments—all were subject to annual fluctuations.

9. The village head man and his accountant, and other village officers, were to be found in Sind, as elsewhere in India; but they were systematically discouraged, their emoluments confiscated, and everything done to decrease their influence, as if it were inimical to good government. Village boundaries were so little known or recognized officially, that the first answer of all the most experienced Revenue Officers, European and Native, was generally that nothing of the kind existed; and when local inquiry had shown their existence in some districts, instructions to inquire on the subject elsewhere were generally regarded as evidence of a determination to find Indian institutions in a country where they were unknown.

10. Instead, therefore, of either adopting existing districts, or making new distinct divisions, by grouping villages into districts, as might easily be done in India, it became necessary to make a commencement of permanent territorial divisions, by portioning out the Collectorates into districts of suitable size (Kardarates), without much reference to, or aid from, any existing divisions.

11. This arrangement was necessarily attended with many disadvantages; and its difficulties were much enhanced by the extreme deficiency of local knowledge on the part of many European Officers. In the Hyderabad Collectorate especially, from never having been encouraged or required to move about, and from being debarred from any active share in the revenue management, several Officers, of considerable ability in other respects, had not even a general acquaintance with the localities of districts, of which they had been several years in charge.

12. When the district divisions (Talookas) had been fixed, and their establishments settled, the Collectors and their Deputies were requested to instruct each District Officer to make inquiry as to the number and names of villages within their respective districts, and to submit lists of them.

13. The result showed how little was officially known regarding matters of local notoriety to every cultivator. A few of the European Officers, by directing their inquiries to the Zemindars and cultivators, ascertained the ancient divisions, well known by tradition to those classes, and sent in correct lists; but such Officers as trusted to their Native officials sent in lists utterly erroneous, the Meers' old boundaries of jagheers and estates, and lands belonging to particular canals, being as often followed as the real village divisions.

14. It will be clear from the above statements, that to obtain fixed territorial divisions subordinate to the large districts (an indispensable preliminary to any revenue settlement) is now even more laborious than if the country were lately acquired, and nothing whatever were laid down on the subject in our records.

15. The object of the Rules now forwarded, is to direct and assist the Officers employed on this work; and what has been remarked of the existing state of our knowledge on the subject may explain the necessity of many rules which

would otherwise appear of too elementary a character to be required by any Officer qualified to be employed on such a task.

16. The above remarks may likewise show why it is impossible to entrust the duty to an establishment separate from that in charge of the district. The information which the district authorities would at once put at the disposal of a survey establishment in India has in Sind yet to be collected—a good deal of it from oral inquiry among the people, and from personal examination of localities. This information has then to be carefully sifted and arranged, before it is available for use.

17. I purpose to make a commencement in each Collectorate, by entrusting the duty to the ablest and most experienced Officers in charge of districts; and with a view to give them the leisure requisite for such inquiries, to attach to each a junior Deputy, who will, after a time, relieve the Settlement Officer from most of the current duty, and also himself acquire, under such superintendence, experience and practice of the most valuable kind.

In Upper Sind, Lieutenants Cowpar and Ford; Hyderabad, Lieutenant Jameson; Kurrachee, Lieutenant Phillips.

18. When the establishments provisionally sanctioned by the Government of India are introduced, there will be five Supernumerary Deputies, two of whom (Captain Johnstone and Lieutenant Tyrwhitt) will officiate in acting vacancies in charge of districts, and the other three (Captain Southey, in Shikarpoor; Mr. Stack, C. S., Hyderabad; Captain Hodgkinson, Kurrachee) I purpose employing in the manner above described, to enable the senior Deputy in each Collectorate, who has been selected for settlement duty, to devote more time to that work.

19. While so employed, I would suggest that the Supernumerary Deputies should draw the lowest rate of pay and allowances, which will form the only present extra charge for European superintendence.

Pay Rs. 500 per mensem (future incumbents Rs. 400), with Travelling Allowance when absent from the head quarters of a Deputy, or of the Collectorate.

20. But after a while, as more Officers become qualified and available for such settlement duty, I propose to increase the number, so as to complete the whole work at the earliest possible period.

21. For Native establishment, I would propose to submit contingent bills for six months, at the end of which time it will be possible to submit for sanction a statement of what establishment will be permanently required.

22. Till an experienced Superintendent can be appointed, I will do my best to supply his place. But as it is not possible I should do full justice to the duty, no time will, I trust, be lost in appointing a Superintendent.

23. Enclosed are copies of a correspondence with Major Steuart, Collector of Shikarpoor, with reports on the assessment, and on the best mode of revising it, by that Officer, and his Deputies Lieutenants Pelly,

No. 3.—From Captain T. R. Steuart, No. 33, dated 24th January 1854, with Enclosure.

No. 4.—To ditto, No. 1034, dated 28th March 1854.

No. 5.—Statement showing the extent of cultivated land in the Shikarpoor Collectorate, in 1852-1853.

No. 6.—Report of the Collector of Upper Sind on the Assessment of the Shikarpoor Collectorate, with Enclosures A, B, C.

No. 7.—To Collector, Shikarpoor, No. 3374, dated 11th November 1854.

No. 8.—From ditto, No. 468, dated 18th December 1854, with Enclosures.

No. 9.—To ditto, No. 146, dated 15th January 1855.

No. 10.—From ditto, No. 467, dated 15th December 1854, with Enclosures.

No. 11.—To ditto, No. 3, dated 1st January 1855.

No. 12.—Mr. Deputy Collector Young's Memorandum.

Ford, and Wallace. The attention which Major Steuart has devoted to this very important branch of his duty merits every praise. There is also a memorandum by Mr. Arthur Young, which will well repay perusal, as illustrating the present state of our revenue arrangements, and the necessity for measures such as those to which I now solicit the sanction of Government. It will justify the regret I expressed at the loss of that Officer's services.

24. I would recommend that all these papers, which will be of much value to Officers employed on survey and settlement duties in Sind, be printed for circulation: if deemed of sufficient general interest, they might form a portion of the published Revenue Selections.

25. I trust that the measures taken will meet with the approval of your Lordship in Council, and that I may be permitted to carry out the revision as rapidly as qualified Officers can be found to superintend the operation.

I have the honour to be,

My Lord,

Your Lordship's most obedient Servant,

H. B. E. FRERE,

Commissioner in Sind.

Commissioner's Office, Camp Meerpoor, 12th January 1855.

[No. 1.]

No. 34 OF 1855.

REVENUE DEPARTMENT.

From the COMMISSIONER IN SIND,

To the COLLECTORS OF KURRACHEE,
HYDERABAD,
SHIKARPOOR.*Dated 4th January 1855.*

Sir,

I have the honour to forward a copy of Rules which I have drawn up for a rough Survey, designed to supply a temporary substitute for a scientific Topographical Survey, till that most necessary operation can be undertaken by competent Officers, but more especially to furnish the data indispensable to a rough Revenue Settlement.

2. A Superintendent, who will have a general control over all the operations, will hereafter be appointed, the work being under the immediate charge of the most experienced and able of your Deputies.

3. As soon as a Superintendent is appointed, all such Officers will correspond direct with him, and he will communicate with the Collector or Commissioner, as he may think necessary.

4. Pending the appointment of a Superintendent, the Settlement Officers will correspond with you on this as on all other branches of their revenue duties, and you will, when necessary, refer to the Commissioner.

Shikarpoor, Lieutenants
Cowpar and Ford; Hy-
derabad, Lieutenant Jame-
son; Kurrachee, Lieute-
nant Phillips.

5. For the present ——— is selected for this duty: whenever you think any other of your Deputies in charge of a district is qualified for a work of so much responsibility and importance, I shall be obliged by your informing me.

6. To enable Lieutenant ——— to undertake this duty, your Supernumery Assistant should be deputed to assist the former in the charge of his district.

Shikarpoor, Captain South-
they; Hyderabad, Mr.
Stack; Kurrachee, Captain
Hodgkinson.

7. You should instruct [Lieutenant Cowpar] to make over to [Captain Southey] all the current duties of his districts, which he considers [Captain Southey] capable of performing efficiently; but he should retain under his own immediate and entire charge the current revenue work of that Talooka in which he may decide upon commencing operations. I believe that this arrangement will, better than any other, give him the leisure requisite for a work requiring so much undivided attention, and provide for that control over the current revenue management

which is essential to the success of settlements made under circumstances such as those we now find in Sind.

8. [Lieutenant Cowpar] should at his earliest convenience report the Native establishment which he considers will be necessary. It may be paid by contingent bills, to be submitted monthly for sanction for the first year. This will afford sufficient time to organize the establishment, and to test experimentally its sufficiency, after which its permanent sanction will be applied for.

9. As soon as a list of villages in the district has been compiled, according to Rule 15 of the enclosed Memorandum, a copy of such list should be forwarded through the Collector to the Commissioner.

10. When one village is completed, the papers in detail should be forwarded for inspection.

11. Should there be any difficulty in providing a sufficient number of compasses furnished with cards which a Native can read, I may mention that Native compasses, such as appear to have been used in the Punjaub rough village surveys, are made at Sehwan.

12. Printed copies of the Rules now sent will be forwarded as soon as they are ready. In the mean time, I shall be glad to be favoured with any remarks and suggestions which may occur to you, or to your Deputies who are to be employed on this duty.

I have the honour, &c.

(Signed) H. B. E. FRERE,

Commissioner's Office, Camp, 4th January 1855.

Commissioner.

(True copy)

J. GIBBS,

Assistant Commissioner.

[No. 2.]

Memo. of Rules for a Rough Survey and Settlement in Sind.

There is at present no complete survey or plan of any district in Sind. The lithographed maps of Collectorates, compiled by the Quarter Master General's Department from the records of the Sind Survey Department, have been most useful; but they are framed from confessedly very incomplete data. The boundaries of no single Collectorate are accurately laid down; few of the Purgunna boundaries or of the canals are perfect; there is no attempt to mark village boundaries, and the greater portion of each Collectorate is a blank, and has not been filled in at all.

2. I know of no single village of which there is an accurate plan on a scale

to be useful for fiscal purposes, nor (except in the Thurr and Parkur district) even such list of the estates or fields as is to be found of almost every village in our older provinces. I doubt whether there be a tolerably correct list of even the villages of more than half a dozen of the 66 districts (Kardarates) into which the province is divided.

3. The first step towards supplying these wants is now being taken by the Grand Trigonometrical Survey, whose triangles will form a skeleton of that kind without which no survey, for either fiscal or general topographical purposes, can be considered complete.

4. It is to be hoped that the Surveyor General may see fit to recommend, and the Government of India to sanction, a Topographical Survey of the whole province, on the most perfect, and therefore in the end the cheapest plan, under the immediate superintendence of the Surveyor General's Department.

5. Such a Survey would furnish a map, showing on a large scale all permanent objects and boundaries, down to, it may be hoped, the boundaries of villages.

6. The boundaries, and most other particulars relating to estates, or other divisions subordinate to villages, must, as a general rule, be ascertained and recorded by a separate agency, the object of which will be to make an accurate Revenue Survey of the country.

7. In most parts of India, it would probably save time and expense, and render the work more perfect, that the scientific Topographical Survey should precede, and form the skeleton or ground-work of the Revenue Survey.

8. But it may be doubted whether such a course would be always practicable in Sind, where few or none of the village boundaries even are marked or recorded, though all are known to the villagers. It will consequently be necessary to ascertain and mark village boundaries, before they can be laid down by a scientific Topographical Survey.

9. Experience shows, that this preliminary operation cannot in Sind be entrusted to the Native District Officers, without the superintendence of an experienced European Officer, because the Native officials have been so long used to a system which ignored all ancient and permanent divisions, that they cannot, without careful training, be made to understand what is required, and to learn the very simple process by which it is to be ascertained.

10. This inquiry and demarcation of village boundaries may be best superintended by those Officers who may be selected to make preliminary revenue settlements in lieu of the imperfect expedients for levying the land revenue heretofore in force. The one operation will very materially assist the other, and both together may supply to some extent the present want of a Revenue Survey. : It will be but a rough and imperfect substitute; still it will be better none, and will be of very great value to our Revenue Officers, till such as a perfect Topographical Survey, and a good Revenue Survey founded it, can be made.

11. The Officer selected for the duty should in the first instance make himself accurately acquainted with what may be already on record relative to the district in which his operations are to commence, and ascertain whether such records are likely to be of any and what service to him.

Records.

12. If any kind of survey has ever been made, he should learn where its records are, and what they contain. Portions of the country have been partially surveyed by Boundary Commissioners—others by the Sind Survey and Canal Department; and the records are to be found in the Offices of the Collectors and Political Officers, the Commissioner, the Quarter Master General's Department, the Superintending Engineer, and the Military Board.

Of previous Surveys.

13. The revenue records in the Collectors' and Kardars' offices should be examined, and such portions as relate to the district in which operations are to commence should be made accessible to easy reference.

Revenue Records.

14. The first object is to settle the dehs or villages, each of which is to form a unit of territorial division in the Talooka records, to possess a separate page to itself in the Talooka ledger, and to have its accounts kept separately and distinct in all the Talooka and Tuppadaree books.

15. Any lists of dehs or villages which exist should be examined and compared; whichever appears most correct and complete should then be gone over in the presence of the principal Zemindars, with whose help it will not, in general, be difficult to frame a perfect list of the villages or townships (dehs or mouzas), or divisions analogous to the villages, as they are known to the Zemindars themselves; with the boundaries entered according to the villages which bound them, a list of their principal Zemindars, and a rough estimate of the area of each.

Lasts of Dehs or Villages.

Definition of a Village (Deh).

16. It may be well to define that a deh or village is a division very similar to a parish in Europe, the lands of which are (as a general rule) all contained within one unbroken ancient boundary, known to the cultivators as having been recognized by themselves as far back as the time of the Kulloras.

17. This latter part of the definition is perhaps the most important, as distinguishing the ancient division of dehs (which appear to be as ancient, well defined, and well known to the more intelligent cultivators here as the mouza is in India) from the various modern divisions, introduced by rival Meers and their Kardars, to partition favourite spots of lands, shikargahs, &c. by Jagheerdars, by canal-digging speculators, who got limits set up to define what lands belonged to particular canals—all which modern, and often arbitrary divisions, have caused such hopeless intricacy, uncertainty, and confusion in the accounts of land revenue.

18. A deh may or may not be conterminous with one or more estates or zemindaries. Many dehs contain a considerable number of separate zemindaries.

darees, and some single zemindarees comprise several dehs. The limits of zemindarees held by Belooch Zemindars, who came in with or after the Talpoors, are often arbitrary, and apt to set all ancient divisions at defiance. But the boundaries of old Sindee zemindarees are generally very useful in ascertaining the village boundary, though not by any means infallible guides.

19. The cultivating classes in general have of late years become so used to frequent changes in the locality of their habitations, and so many districts are wholly or to a great extent waste, that some old dehs contain no inhabited village or collection of permanent habitations, while two or more such permanent localities of cultivators' habitations are to be found in other dehs. The point is one of minor importance in distinguishing what is and what is not a deh; but it is often desirable to distinguish the old village from modern hamlets, and for this purpose it may be remarked, that a village in which Sindee cultivators and Hindoos are found is very frequently an old site, and that where the inhabitants are exclusively Belooch, it will frequently be found that they are a modern military colony, planted within the century.

20. In some districts the dehs are too large to form a convenient unit of territorial division in the Talooka accounts.

Division of inconveniently large Dehs.

21. In such cases there will sometimes be found ancient and well known sub-divisions (like the pooras of a large village in Guzerat, or the warees in the Deccan), which should be carefully ascertained, and, if found convenient, adopted. Where no customary sub-divisions exist, and there is no doubt of such sub-division being necessary for convenience of the accounts, or for other causes, a partition may be made *de novo*. But care should be taken, with reference to the boundaries of zemindarees, and other circumstances, to make such partition as little arbitrary as possible, so that each sub-division should, as far as circumstances admit, resemble a separate deh.

22. In either case, these sub-divisions should be entered in the accounts subordinate to the ancient deh, of which they are fractions.

23. It may sometimes be desirable, from peculiar circumstances, to unite two or more very small dehs; but such cases will probably be of very rare occurrence, and it is always desirable to avoid the necessity for such amalgamations.

24. It is probable that in many parts of the hill and desert tracts on the east and west of the province, there never were any such divisions; and in other parts, which have lain waste for generations, it may be no longer possible to trace them.

Course to be followed where there are no Dehs.

25. In such cases, after careful examination of the natural features of the country, and other local circumstances, fresh divisions must be made, varying according to the prospect of future cultivation, or of the probable for recording grazing or other similar rights, all unnecessary minutiae being carefully avoided.

It should never be hastily concluded, because the country is compara-

tively barren or thinly populated, that therefore such divisions are uncertain or unknown. In the Thurr districts, for instance, every one of the widely scattered fields, and even every sandhill, has its name, and owner; and all are registered by the Guzerathee accountants employed there, with a degree of system and accuracy unknown in any of the more fertile districts in Sind. It is very probable that careful inquiry will show, that in many similar localities, where no names or divisions are now known to us, they exist, and are well known to the inhabitants, however scattered the latter may be.

27. Having satisfied himself that he has got a correct list of the ancient dehs, and that by dividing those which are inconveniently large, or uniting such as are unnecessarily minute, he has got a list of territorial divisions, of a character to be of lasting utility, without further change, the next step of the Settlement Officer is to have the boundaries of such divisions marked and recorded in a permanent manner.

Village Boundaries how to be marked.

28. In many cases, no permanent boundary-mark will be needed: the river, or a canal, or tank, hills of stone or sand, or roads, often form as good a boundary as could be desired.

29. But in most cases, it will be necessary to place artificial marks *de novo*; and as a necessary preliminary to further operations, a set of rules for fixing and preserving the village boundary-marks should be drawn up and sent through the Collector and district officials to the village Zemindars, and published by beat of tom-tom, and by service of a copy on the head man of the village. A copy should at the same time be forwarded to the Commissioner.

30. Stones, conical mounds or long ridges of earth, with jars of charcoal buried in them; broad paths cut through jungle, and kept clear of trees and bushes, brick pillars, trees, canals, and other expedients, may be adopted, according as varying local circumstances render one or the other the cheapest and most permanent mode of demarcation.

31. As a general rule, the villagers themselves should fix their boundaries; the expense, whether of money or labour, being fairly divided between conterminous villages.

32. But where the expense of fixing permanent boundaries is likely from any circumstance to fall heavily on the villagers, a portion may be borne by Government, previous sanction being duly obtained.

33. When the boundaries are reported as fixed, and ready for inspection, the Settling Officer, having recorded his reasons for being satisfied as to their sufficiency and permanency, will order them to be recorded, according to a form for which he shall first obtain the approval of the Commissioner.

Record of Village (Deh) Boundaries.

34. The form, after specifying generally the conterminous villages (dehs), shall commence at one well defined and well described boundary-mark, and detail in a regular consecutive series the several marks, and their respective distances from, and bearings to, the marks immediately before and after them

in the list, as well as to any permanent and well defined object, if any exist, within sight of the boundary-mark.

35. In all cases of disputed boundary, the Settling Officer shall first require the disputing parties to define clearly, by temporary marks set up by themselves, the boundaries they respectively claim.

36. He shall then proceed to examine the locality, and the evidence adduced by both parties, and shall decide on and mark the boundary, recording clearly and at length the reasons for his decision, and the boundary he has laid down, and giving a copy of such record to each of the contending parties.

37. Such decision shall be final as regards the village boundary, unless appealed to the Commissioner within one month from the date of delivery of the copy of the award; and the Commissioner shall have power to annul the decision, and order a fresh inquiry, but not himself to alter the boundary so laid down.

38. The Commissioner shall also have power to inflict fines for frivolous or vexatious disputes, or appeals regarding any boundary.

39. The Settlement Officer shall, as far as possible, ascertain from the jagheer records and reports of District Officers, &c. the names of all persons claiming to be either Zemindars, or holders of jagheer or rent-free land in any village.

40. He shall then cause a notice to be served on each Jagheerdar or Zemindar, requiring him to erect within a specified period boundary-marks along the boundary of his jagheer or zemindaree, and warning him, that in default of his so doing, the marks will be erected by a Government establishment, at his expense.

41. The nature of the boundary-mark required shall be clearly specified, in a notice which shall be published in the same manner as is prescribed for village boundaries (vide *supra* paragraph 29), and of which a copy shall be sent to the Commissioner.

42. Where a final definition (fysulnama) of a jagheer has been drawn up by the Jagheer Department, a copy shall be furnished to the Settlement Officer, who will ascertain that its provisions have been duly carried out, and he shall, in so doing, as far as possible distinctly mark off and record all prospective resummptions, noting the contingencies on which such resummptions will depend.

43. Any boundaries which a Jagheerdar or Zemindar is required to provide, and which may be found incorrectly or insufficiently marked, when the Settlement Officer's establishment visits the village, shall be corrected and properly marked by that establishment, and the costs of the operation shall be recovered from the defaulting jagheer or zemindaree as a revenue demand.

44. The boundary-marks for any subsidiary divisions of fields, &c. which may be required for convenience of record, or for other purpose, may be set up by order of the Settlement Officer as he may see fit, and the costs thereof

Demarcation of Fields,
and other Sub-divisions of
Jagheers or Zemindarees.

shall wholly or in part be borne by Government, as the Settlement Officer may see fit at the time to direct.

45. Any dispute regarding the boundary of a jagheer, a zemindaree, or any of their sub-divisions, shall be settled in the same mode as above prescribed (paragraph 35) for disputed village boundaries.

• Disputed Boundaries of Jagheers, Zemindarees, and their Sub-divisions.

46. Government forests (or shikargahs) shall be treated according to their size as separate dehs, or sub-divisions of dehs, all forest boundaries being settled in communication with the Forest Ranger.

Forests.

47. The Settlement Officer shall then cause the boundaries, area, and other particulars regarding each jagheer and zemindaree, or of any sub-division of either, to be recorded, according to a form previously approved by the Commissioner.

• Record of Boundaries of Jagheers, Zemindarees, and their Sub-divisions.

48. The form shall enumerate each zemindaree or jagheer, and its sub-divisions, assigning a separate number to each in regular series, commencing from some well defined and well described spot. It shall specify—

1st, The name of the number, if it has one.

2nd, The bearing from the spot just specified as the starting-point, or from the number last described in the series, and from any conspicuous landmark which may be in sight.

3rd, The conterminous numbers, and their bearings.

4th, The boundary-marks of the division or sub-division, in regular series, giving the bearing and distance both of the mark before, and of the mark next after each mark in the enumeration, and specifying the conterminous numbers as the boundary passes them.

5th, Any permanent marks, such as canals, roads, remarkable trees, pukka wells, or buildings, in or near the number.

6th, The area of the number, specifying whether it is ascertained by any kind of measurement, or by estimate.

7th, The character of the soil, and, if of varying quality, the extent of each variety.

8th, The owner's name and tenure.

9th, The occupier's name and tenure.

10th, Whether paying the ordinary full assessment (ryottee), or rent-free, or liable to quit-rent (puttadaree on jagheer, &c.).

11th, The produce at the time when it was surveyed, and also its usual produce.

12th, The mode and amount of assessment proposed.

49. The mode of ascertaining the first five points above specified requires no remark.

50. Great judgment is required on the part of the Settling Officer to

Size of Numbers.

decide what limit should be fixed as to the size of numbers: if too small, they will greatly and unnecessarily increase the expense of the survey, and the time required for its completion; if too large, the record will be too vague and indefinite to be of use.

51. The points to be considered are, what degree of minuteness is required by the wants of the cultivators, and of the Revenue Officers? In cases of doubt, it is better to leave the numbers too large, than to make sub-divisions unnecessarily minute; because over-large numbers can be easily sub-divided, but unnecessary sub-divisions cause much unnecessary delay, labour, and expense, before they can be reunited.

Measurement.

52. The best mode of ascertaining the area will vary according to local peculiarities. There are many thousand square miles of excellent land in Sind, which, as a mere money question, would not now pay for any measurement more minute than by square miles; while there are other lands which would pay for, and require careful and exact measurement; and the two descriptions of land are sometimes to be found in close juxtaposition.

53. In the printed Selections from the Official Records of the Punjaub are many useful suggestions relative to modes of measurement which, though rough in themselves, are sufficiently accurate for present purposes, and perhaps as perfect as the present almost entire absence of properly qualified measurers renders practically obtainable.

54. The mode of measurement adopted should always be specified in a note at the end of each village field-book. It should be reported for the information of the Commissioner at the commencement of each district, and any change which may be found necessary should from time to time be at once reported.

Maps.

55. A map, as perfect as the means at the disposal of the Settlement Officer will admit, should always be drawn up, to illustrate the field-book of each village. It should at least show the relative positions of the several numbers, and of the village boundary-marks; with as much approach to accuracy in the size of the numbers, and their boundaries, as the agency employed will admit of.

Classification of Soil.

56. The remarks (paragraph 49 *supra*) relative to the judgment required to determine the degree of minuteness to which it is advisable to carry the division of numbers, will apply also to the degree of minuteness desirable with regard to classification.

57. Whether high or low; sandy or clayey; impregnated with salt or soda, or free from either; how it is, or may be supplied with water (by wheel, moke, or sylabce); whether it is adapted for rubbee or khureef crops, and what is usually grown: whether it requires any, and what fallows or manure—are all points which may be easily recorded as regards all arable land, and should never be omitted.

58. What classification beyond this may be practicable or desirable will depend on local peculiarities. In his preliminary report, on commencing operations in a district, the Settlement Officer should state, for the Commissioner's information, what course he proposes to follow in this respect, and he should from time to time report any material deviation from his original plan which he may find desirable.

59. The 8th and 9th points above specified involve questions of tenure, and require careful inquiry.

Tenures, and Proprietary Rights.

60. The ordinary tenure in Sind is that of a Zemindar or landholder, who exercises wholly or in part the privileges of the landowner. The extent of such privilege varies, according to custom, from that of an absolute proprietorship of the land, subject to the payment to Government of whatever may be the customary Government share of the produce, down to that of an ill-defined and often disputed claim to levy a lapa, or rent, on all cultivated land. Sometimes the Zemindar is also the cultivator, or the cultivator is removable at the Zemindar's pleasure; at others the cultivator is quite independent of the Zemindar, and claims all but the name of the landholder.

61. In some districts there is a third party, who bears a portion of the expenses of cultivation, and levies a distinct share of the produce, of which there are then often four sharers—Government, the Zemindar (the landlord), the Mokadum (the banker), and the Hari (the cultivator); and where Mokadums are found, the Zemindar sometimes disappears, or his claim is merged in that of the Mokadum.

62. In investigating the subject of tenure, it is peculiarly desirable in Sind to dismiss all preconceived theories,—to make careful inquiry from the parties concerned,—and not to accept as true, without such inquiry, all that Government Moonshees and Government records may state on the subject; and to bear in mind that the inquiry is one of simple fact, as to what were the rights claimed and exercised by each of the parties concerned, in the best times of former regular government.

63. It is a subject which has never been carefully, dispassionately, or thoroughly investigated by parties possessing the time, previous information, and other requisites to form a correct judgment. The Talpoor Meers were inclined to push to the utmost their despotic claims to entire and uncontrolled authority over the land; but they hardly carried their theory so far as the practice of many of our Revenue Officers, who are not only inclined to deny anything like private property in the land, but have even issued proclamations, formally and in express terms abolishing all rights analogous to those of landlord or landowner, and reducing the cultivator to a mere tenant-at-will, holding direct from Government.

64. The respective rights of Zemindar and Hari require careful inquiry. In some parts of the country, the Hari allows that he is a mere labourer; in others he asserts, with a pertinacity justified by usage, a right to cultivate as

long as he duly pays the Government share, and his landlord's quit-rent (or lapa). Where such a tenant right is claimed, it is not to be set aside, except on clear failure of the Hiri to establish any prescriptive title.

65. On the 10th point, reference should be made to the Jagheer Department before the settlement of the village is commenced, to know what jagheers, puttadarees, hissadars, muna-feedars, or other concessions of, or exemptions from, Government assessment are registered in the Jagheer Department, as allowed in that village; and again, on the completion of the Settling Officer's inquiries, a report should be made to the Jagheer Department, stating whether any and what discrepancy has been found to exist between such admitted right and the actual enjoyment of the claimant.

66. The Government records (buttai, kusraś, churuksumaris, &c.) will afford a degree of information regarding the produce in years past, which, though of little use in its present crude form, may be made of much value when properly tested and digested. In no part of India is there so much on record relative to the gross produce ascertained at the time by actual measurement; and as a means of ascertaining the actual or average produce of given areas of land, these records will well repay the labour necessary to extract the information they contain.

67. To fix the mode and amount of assessment is the last and most important, if not the most difficult part of the Settlement Officer's task.

68. It is unnecessary to describe the customary modes of assessment—by buttai or division of the gross produce, kasghee or grain-rents, or mahsoolee or cash-rents.

69. Nor is it necessary to dwell at length on the manifold evils of buttai as a general system.

70. In a settled district, it is only permissible—

1st.—As a means of equitably sharing the loss when the produce is, from unforeseen causes, so much reduced below an average, that the cultivator can no longer pay the money assessment fixed on his land.

71. It may therefore be allowed in cases of failure where remissions of assessment are claimed, and the right to claim it should be reserved to cultivators who apply for it within a given period after the subsidence of the inundation, and who wish to have all crops of their whole estate, whether khureef or rubbee, buttaied for the year.

72. If the assessment be light and equitable, buttai will never be applied for on such terms, except under the pressure of real misfortune; and the necessity for resorting to actual division of the produce will be still more rare, as it will in such cases seldom be difficult to afford reasonable relief, by a reduction of the Government demand, without inflicting on Government the

loss, and on the impoverished cultivator the other misfortunes, incident to actual buttai.

2nd.—Buttai is sometimes unavoidable on those lands, the crop on which, like much of the rubbee and the rain crops, is a mere lottery.

73. Many rubbee lands admit of being as accurately marked out into measured portions as any others, and whether a greater or less portion be flooded, the extent of land sown may always in such localities be ascertained without annual measurement, by a simple inspection of the boundary-marks of such measured portions as are entirely cultivated. Those portions which are only partially cultivated may, if necessary, be subjected to actual measurement.

74. There will still, however, remain much rubbee land, where the locality and amount of produce is so uncertain, that its approximate amount can only be ascertained either by annual measurement, or division of the produce.

75. In all cases where the records of past years show that an assessment fixed on an average of past years, omitting the very favourable seasons, could be paid in ordinary years, it is better to allow the cultivator the full benefit of the very favourable seasons, and to submit to a considerable present loss of revenue, rather than perpetuate the evils of buttai.

76. With very few and rare exceptions, therefore, there can be very little difficulty in making a cash settlement, as has been done, I believe, everywhere throughout the Punjab, where buttai was, under the Native government at least, as common as in Sind.

77. On wheel lands, there can never be any difficulty in levying a fixed money assessment; the settlements at so much per wheel, to which the inhabitants are well accustomed, and which are most popular, are hardly inferior, as a means of assessment, to a fixed beegotee.

Wheel Assessments.

78. It is a common custom to introduce into wheel settlements a clause limiting the number of beegas which shall be allowed per wheel, and subjecting all over that amount to separate beegotee assessment on measurement.

79. The reason assigned for such provision is, that in very favourable seasons and localities a single wheel may be made to irrigate a far larger portion of land than was intended when the wheel rate was fixed.

80. But the operation of such a clause is every way detrimental to the cultivator's interest, and the object may often be quite as easily attained by settling each estate at so many wheels—the number may be easily determined by inquiry as to the capabilities of the estate, including the average of past years. It may then be stipulated, that whatever the season, the Government demand will not be enhanced, whether the number of wheels be more or less. If the season be bad, the cultivator, by applying in good time, may ensure examination of his estate; and if reasonable cause be found to exist, the demand may be reduced as the number of wheels, or the extent of land irrigated from each wheel, may be found to have fallen below the expected average.

81. The actual number of wheels set up, and the extent irrigated, ought, however, to be annually ascertained and recorded as a statistical fact, which it is very necessary to know.

82. In well populated and well cultivated districts, an ordinary beegotee assessment is here, as elsewhere, the best: the great difficulties are to get rid of annual measurements, and the frauds and oppression inseparable from them.

Beegotee.

83. This is not very difficult where field-boundaries exist and are recorded. In such cases, by due allowance for fallows, all the District Officers have to do is to ascertain what fields are cultivated, and what waste and fallow.

84. In the absence of an accurate field-book, or where the fields are usually cultivated throughout only a portion of their whole extent, a list of wheels may, without actual measurement, give a good approximation to the extent of irrigation.

85. Some cases will for the first few seasons remain, in which actual measurement may be necessary; but the number ought annually to decrease as field-boundaries and field-books are provided where none before existed, and as fields which may at first be found inconveniently large are sub-divided.

86. At present the beegotee rates which obtain, whether in grain or money, are generally uniform throughout the whole Collectorate. It is hardly necessary to observe that such uniform rates must be very unequal in their pressure. If equitable in bad soils and remote districts, they must be so light as to involve a needless sacrifice of revenue in good soils, and near large markets; and *vice versâ*, if adapted to the good soils, they must bear hardly on the bad. To meet this, it will be necessary that the rates vary according to the quality of the land, its proximity to market, and other circumstances affecting the amount and value of the produce.

87. Whatever the mode of assessment, it should always be expressed in grain, and converted at a fair average into the money rate which may be fixed. This will facilitate re-adjustment as prices vary.

88. Assessments should be either simply for the crop or fusi (peshrus, khureef, or rubbee), or for all the crops of one natural or inundation season—of “one water,” as it is termed by the Natives. The latter is by far the preferable plan when practicable, as it affords the cultivator an inducement to make the most of his land, and to take every advantage of any accidental facility to get an additional crop.

Period of Settlement.

89. No settlements should on any account be made on the system heretofore so general, of including as one year's settlement portions of different inundations—the rubbee of one and the khureef of another. It may be necessary so to divide the year's payments in order to fit them into the financial year. But this is an object quite distinct from the settlement with the cultivator, which should be made to follow the agricultural (*i. e.* the inundation) season, from the first rise of the river to its final subsidence.

90. Whenever the cultivator wishes to secure a lease, either of a village or any portion of it, with a view to secure himself against any enhanced assessment in consequence of improvements which he may make in the land, every encouragement should be afforded him to do so, for terms not exceeding thirty years.

Settlements for Terms
of Years.

91. But such leases must be held subject to the confirmation of the Commissioner, for obtaining which, a separate report should be submitted of all leases proposed for confirmation in any district.

92. The report should contain such information as may enable the Commissioner to judge of the expediency of confirming the lease, and particularly as regards the tenures of all parties concerned, so that the rights of third parties may never be made over to the lessee, unless at the request of the parties concerned.

93. When leases are granted to a Zemindar of any portion of his own zemindaree for the purpose of sinking wells, it will be merely necessary to show that care has been taken to ascertain that the lessee is the real Zemindar, or a person specifically empowered by him to take the lease, and to state the terms of the lease.

Leases to sink Wells.

94. The number and nature of canals, and the degree to which Government and the cultivator are responsible for new works, and for annual canal clearance; the water privileges of separate Zemindars or Jagheerdars, with reference to the capacity of their canals, &c. should all be carefully inquired into and recorded.

Canals.

95. The water-rates should be carefully investigated and revised, and where they were formerly levied, and have of late years merged in the general assessment, care should be taken to keep them distinct; all claims to exemption from water-rate should be carefully inquired into, and the result recorded.

Water-rates.

96. The same may be said of liability to furnish statute labour for effecting the annual canal clearances, a subject which in many parts of the country requires careful inquiry and revision.

Statute Labour.

97. In everything affecting canals, free and unrestrained reference should be made to the Canal Department, both beforehand to obtain information already there on record, and subsequently to test information freshly acquired, and to communicate the result of further inquiries.

98. Where, as is usually the case, statute labour is, by custom, exigible for the clearance of roads and construction of bridges, such liability should be commuted into a money payment, to be separately collected and brought to account, and to be applied as a local road and bridge fund.

Statute Labour for making
Roads and Bridges.

99. With this it may often be possible, and is most desirable, if the people are willing, to combine a separate cess for educational purposes.

100. Inquiry should be made as to the periods which it may be most convenient to fix as the instalments (kists) for the payment of the sum due on each crop, so as to afford protection to the cultivator against unreasonable demands—a very important subject, to which too little attention is often paid.

101. As each village is settled, the Settlement Officer should give, under his own seal and signature, to each Zemindar, a detail of the settlement proposed for his estate.

Puttas, and Copies of Records. 102. Every encouragement should be given to Zemindars to provide themselves with correct copies of all records, maps, &c. relating to their own estates. They should be given without charge, except for paper, and wages of copyist.

103. The powers and functions of the Patels, Village Officers. Wudderas, and head men, or other village officers, should be objects of special inquiry and report.

104. In all cases where practicable, the ancient custom of allowing a small remission (mamool, seeree, &c.) to the Patel, as remuneration for his duties as a Revenue Officer, should be revived, and defined; care being taken to establish that it is a purely official allowance, and to provide for its resumption in case of neglect.

105. The Settlement Officer should bring to the notice of the Magistrate all Patels who he thinks worthy of exercising the judicial powers which have of late been entrusted to a few of their body. As a general rule, it is desirable that such powers be entrusted to none but men who can read and write a little.

Judicial Powers to Patels. 106. Care should be taken to make inquiry regarding, and to revive, as far as possible, the office of Village Accountant (Putwaree or Canongoe). Under the Meers, they were depressed and neglected, and we have hitherto done our best to obliterate all trace of the office, greatly to our own inconvenience, and to the injury of our system. They might doubtless be made to do, as the analogous official does throughout India, a great portion of the duties of the Tuppadar, and thus relieve that functionary from a portion of duties which are now often too onerous for him to perform properly. In some districts of the Punjaub, much use has been made of the Putwaree's agency in the rough preliminary surveys, for which, however, they of course required preliminary instruction.

107. The best mode of restoring this useful class of public servants should form the subject of a separate report from each Settlement Officer.

108. As the settlement of each village is finished, the results should be condensed into a report in the vernacular (Sindee), copies of which should be deposited with the head man, where there is one, as well as in the district and Collectorate records.

Village Report.

109. In it should be noticed, where they exist, any shares enjoyed by other parties than Government (such as Puttadars, Hissadars, &c.) in the village revenues. .

110. The records of the last census should be embodied as far as possible in the village reports.

111. At the conclusion of the settlement of each Talooka, or of any defined portion of one, an English report should be drawn up, for submission to the Collector and Government.

Purgunna or Talooka Reports.

112. This will be the appropriate time to re-consider and re-adjust the district (Talooka) boundaries, some of which are at present very inconvenient, and require alteration.

Re-adjustment of District Boundaries.

113. Each Settlement Officer will send quarterly through the Collector, for the Commissioner's information, a report, showing in a tabular form the quantity of work done: these reports will be due 1st January, April, July, and October; and if delayed more than a fortnight, the cause of delay should be specially reported.

Periodical Reports.

114. The July report should give the result of the last season's as well as the last quarter's work; and any suggestions for alterations in, or additions to the permanent Rules or establishment, which the Settlement Officer may consider advisable, should be submitted at the same time.

(Signed) H. B. E. FRERE,
Commissioner in Sind.

(True copy)

J. GIBBS,
Assistant Commissioner.

[No. 3, & Enclosure.]

No. 33 OF 1854.

REVENUE DEPARTMENT.

From Captain T. R. STEUART,
Collector of Upper Sind,

To H. B. E. FRERE, Esq.,
Commissioner in Sind.

Dated 24th January 1854.

SIR,

With reference to the Acting Collector's letter No. 325, of the 12th September last, on the subject of the present rates of cash-rent in this Collectorate, I have the honour to submit a few remarks ; for although I perfectly agree with what the Acting Collector has set forth, there yet remain some important points, which are quite as worthy of consideration as the reduction of the rates, and affecting, probably, in a still greater degree, the interests of the cultivator and of the Government.

2. It is presumed that the prices of the produce at the time the seven years' settlement was made were sufficiently high to warrant the hope that these rates of land-rent then fixed for every description of product might allow of a liberal remuneration to the grower. Prior to that, the Zemindar enjoyed certain immunities, such as in some cases a partial or total exemption from statute labour, to the prejudice of his poorer and less influential neighbour. He held also mamool grants in grain, or in cash, but in most cases rent-free lands, varying in extent from a beega or two to 40 and 50 beegas. This was looked upon as a kind of pay for his exertions in the culture of his lands, and was resumable at any time if he failed in his engagements. These grants appertained to the Meers ; but there were other indulgences, which were vested in the district authorities. Where fixed grain or cash-rents prevailed, they had the power of granting pullo, or remission, to the extent of any failure of crop from whatever cause—blight, locusts, drought, submersion, &c. The measurements were carried out with quite as much strictness as our own ; and if any difference of opinion existed between the land-measurer and the Ameen or appraiser, an average remission was generally struck. The presentation of loongees was of pretty frequent occurrence, for any very creditable show of increased cultivation, or the cutting of a new canal, or the effectual clearance of an old one ; and puttahs were liberally granted, making over new lands at reduced rates of rent, calculated to remunerate for the labour and money expended on them.

3. Vested with such authority, the Kardars under the Meers' rule succeeded in developing the resources of their districts, and not only levied greatly higher

rates than we now do, but realized larger revenues, without, as far as we ascertain, any undue pressure on the cultivator.

4. We abolished all such immunities and grants by the State. We granted (according to Major Goldney's seven years' settlement) no remission for loss of crop, except on account of ghurkee or submersion; and thereafter no distinction was made between the Zemindar who paid a land-rent of Rs. 10,000 and the one who paid two or three hundred.

5. It does not appear from the sunnuds for mamool, or from the puttahs for reduced rents, that these grants were made conditional for any service beyond that of cultivating ground. The sunnuds are still in the hands of the Zemindars, but as they were not recalled on resumption of the grants, it seems doubtful which of them may have been valid at the time of the conquest.* But as regards service, we know that the head Zemindar was liable to be called upon for all kinds of State service,† and for all duties corresponding with the village Patel in our older districts. Although we have established our Police, it has never been intended (whatever the effects) that this should supersede altogether the functions with which we found the Zemindar to be vested. It is much to be regretted, I think, that we interfered with such grants, whatever their object: we may have been seeming gainers‡ of a few hundreds by their resumption, but the chances are that we have been losers of thousands, by overlooking§ the measure of favour or station which they were intended to convey, and forgetting the amount of energy, and even labour, which a small donation can at most times command from the people of this country. I would reward those now, whose exertions of late years have rendered them deserving.

6. I am so impressed with the benefits that are to be derived from this mode of calling into action the energies of a proverbially indolent people, that I would gladly see its revival|| as part of a system which was in many respects well suited to the country.

7. The apparently liberal reduction of the land-rent adopted by us would appear to have in some measure hoodwinked the people, and reconciled them to changes of on opposite tendency. They relinquished their ancient claim to a remission of rent when their fields proved unproductive from want of water, blight, or other providential cause, and agreed to claim it only upon lands submerged (ghurkee). In practice, this rule operated too disadvantageously, and in many cases so ruinously to the Zemindar, that it has for the last three years been set aside in some cases of peculiar hardship and difficulty. It was,

* Still they serve to show what duties were required, and how these duties were remunerated.—H. B. E. FRERE.

† It is much to be regretted that this custom was ever interfered with by us.—H. B. E. F.

‡ I quite concur.—H. B. E. F.

§ No doubt.—H. B. E. F.

|| I quite concur; and any plan which you or your Deputies may submit, for granting mamool and seeree according to fixed rates for such service as is required from Patels in India, shall have my best attention.—H. B. E. F.

in point of fact, the great difficulty the cash-rent payer had to contend with, and, as a necessary consequence, the great obstacle to the introduction to a cash-rent system. Its bad effects were, perhaps, more evident in those parts of the country where the rubbee crop is quickly and regularly succeeded by peshrus, exclusively a cash-paying crop. But at all seasons, the no-remission system has held at a discount all lands upon the productiveness of which there was any doubt, and has caused the people to cultivate that only which was certain of being remunerative.

8. Our experience of the effects of the past settlement also proves that the uniform rate of land-rent for each crop, all products of the crop being charged alike, has tended in a great measure to the disuse of many of the cheaper articles, and to the production of those only which yield a readier and higher market value.* For instance, in the cases of barley, muttur, sirsof, jamba, and mustard, products of the rubbee crop, the land-rent Rs. 2-8-0, and additional ibwab cess 2 annas 4 pies, amounting in all to Rs. 2-10-4 per beega of 2,500 square yards, is out of all proportion to the present average values of these articles. This rate of land-rent for wheat is not complained of so much as that upon the lighter grains.

9. With regard to the peshrus crop, this consists of cotton, vegetables, and sugar-cane. Of the cotton, there are sometimes two and three crops from the same sowing. The first, or neri crop, is generally productive, and the fibre longer, than the after produce. Little care is taken of the plant thereafter; it is not protected by enclosures, and is almost left to chance. This is doubtless the effect of the buttai system, it being immaterial to the grower whether it produces or not. The after crop is seldom owned where it pays cash-rent on sylabee land, unless it promises to be remunerative; and when watered from wells, the after crop is often quite equal to the first.

10. The vegetable and sugar-cane lands are always remunerative.

11. Of the khureef products, with the exception of jowaree and shalee, all may be denominated inferior articles in point of market value.† The cash assessment of Rs. 1-8-0, and ibwab cess of 1 anna 5 pies, in aggregate Rs. 1-9-5 per beega, is not considered too high for the two grains abovementioned. I have this season had many offers of paying cash-rent for the crop, and on inquiry it has been found that the grain-rent realized by buttai was considerably more valuable, even at the present bazar prices. But this rate of rent is more than can be paid from the lighter products, such as bajree, moong, till, &c. Some of these are raised upon kutchra or light land, in the bed and banks of

* This is in itself a decidedly beneficial result, if the lands were all of the same quality; but they are not, and consequently the uniform rate has pressed heavily on lands which would only bear an inferior kind of grain.—H. B. E. F.

† Vide remark on paragraph 8. Jowaree and shalee only grow on the better classes of land, which will pay these rates easily; but those rates are too heavy for the inferior lands noticed lower down in this paragraph, which will only yield bajree, moong, till, &c.—H. B. E. F.

the river. They are precarious,* because they are often overtaken by the rise of the river before they can be reaped, and they are insusceptible in such localities of any but a very light cash assessment, or by buttai.

12. The system of leases† so strongly recommended for this province by Government, and as carried out by my predecessor, has been sufficiently criticized by you in your letter.‡ The leases are with few exceptions considered failures, and Lieutenant Cowpar, in his letter, of which this is a continuation, describes them as failures, and ruinous in their effects, to very many of the Zemindars, and as having caused them to throw themselves into the clutches of the Bunnia money-lenders. By the same Officer, this is attributed to the great fall in the prices; and this fact cannot be better illustrated than by a memo. of the average price of all grains realized in the different years for the grain collected as revenue. The changes which have influenced these matters may, however, be said to have been beyond the reach of human foresight.

Memo.

1847-48	Rs. 30 to 35 per kurwar.
1848-49	23 " "
1849-50	15½ " "
1850-51	12½ " "
1851-52	9½ " "

13. The effects of unlimited demand for this country's products, during the first occupation of the province, the succeeding hill campaign in 1845, and of the Mooltan and Punjaub wars, were only in part counteracted by the pacification of those countries, and at an earlier period by the system of unreserved sale of all Government grain,§ as directed in Government letter No. 7246, of the 18th November 1848, and finally by the abolition of all protective duties on the river and land frontier. The provinces to the north-west, which, during the periods of disturbance above adverted to, were the ready recipients of the Sind exports, now find an easy outlet on the line of the Indus for their surplus produce. While, therefore, we are largely importing the produce of the Punjaub, and thus aiding in the development of its resources, we are debarred by the ruinous transit charges of the beggarly Khelat State from any interchange with other countries beyond it.||

* They are precarious, and ought, therefore, to be more moderately assessed.—H. B. E. F.

† The leases intended by Government were very different from the leases which are now just expiring.—H. B. E. F.

‡ From Commissioner to Government, No. 862, dated 22nd May 1851.—H. B. E. F.

§ I believe that no unreserved sales took place till 1852, and it is self-evident that they can have had nothing to do with lowering prices, because no reserve in selling a perishable article like grain can ever for a permanency, or even for any long period, sustain its price above the natural standard, which in the long run is best ascertained by unreserved sales. Nor can the abolition of transit duties on the river have tended to lower the prices of our grains: at present (January) a large export trade in grain to the Punjaub is being carried on.—H. B. E. F.

|| But Kutchee very commonly exports grain to Sind.—H. B. E. F.

14. All things put together, it is not matter of surprise that the revenues of this part of the province have proved so fluctuating, and that the results of even the most liberal settlements have been unsatisfactory, both to the landholder and Revenue Officer.* We are unable, from the jummas of past years, to form any sure basis for future lease settlements. The district establishments were unequal to ascertain the gross or net produce of any village; and I doubt much if the present establishments will be found able to perform with efficiency this part of their duty.† The accounts produced are falsified, and few Zemindars keep any accounts at all, unless the rents are paid by the Bunnia money-lender, who exacts half the crop by buttai in payment of his advances. Where we have the means of arriving at anything like an approximation of the produce of a village, we should not, I think, stickle at re-granting it in lease, or paying too much heed to equalization of averages; more especially if the owner represents himself a loser by the expired term, and entertains a hope of redeeming his losses from its renewal.‡ Many have entered upon new leases upon the same terms as the last, and I see no disadvantage in admitting this in a country like Upper Sind, where all works of utility and irrigation are executed by the landholder. But on all amanee land, I conceive it is the legitimate right of Government to demand a money-rent, which is within the power of the Zemindar to pay without compelling him to resort to the Bunnia, or driving him to mean shifts and expedients in obtaining the wherewith; or, failing this, from his love for the buttai mode of assessment, to exact to the full extent what we found him to be paying in kind under the Native government.

15. As you are already aware, this is the most expensive method of collection, in its effects demoralizing to the cultivator, and at the same time peculiarly open to fraudulent practices.§ Even when we had realized the grain taken as revenue, we have been at a loss what to do with it. In seasons of plenty, it has rotted in our granaries, and sale after sale has been notified, without attracting a purchaser.|| The last expedient (letter from Commissioner to Collector of Hyderabad, No. 2487, of 3rd December 1851) was to get the cultivator to purchase at a fair valuation the grain he had to pay as revenue.¶ There were several seeming inducements to make him agree to this plan. He

* This is undoubtedly true, and shows the mistake of giving leases, as has been done hitherto.—H. B. E. F.

† I do not quite concur in this.—H. B. E. F.

‡ This is hardly consistent with the sweeping condemnation in paragraph 12.—H. B. E. F.

§ This is a correct description of the system.—H. B. E. F.

|| This is because till lately we could never make up our minds to a system of real unreserved sales. We acted as the Dutch used to do with their nutmegs: having a practical monopoly, we allowed large quantities to spoil rather than lower our prices. There would always have been at least one purchaser if we had adhered to a system of really unreserved sale.—H. B. E. F.

¶ This was no "last expedient," with a view to keep up prices; it was simply a step, which has been quite successful, towards withdrawing Government from the trade of corn factor.—H. B. E. F.

was, as a general rule, saved the trouble of second measurement; he was saved the trouble and expense of its carriage to the Government granary; and he could enter the market at any time he chose. This method was adopted last year. The market prices were steady, and the state of the river up to ——— gave promise of something less than an average crop. But it proved too much for the cultivator to keep his stock in hand for a few days even; and rather than do so, he sold it at a loss of about a rupee per kurwar. This had no sooner been done than the river suddenly fell, and prices rose about 20 per cent.* There was, I believe, scarcely an exception to this in the Chandooka districts; and I could not, perhaps, advance a clearer proof of the distaste and incapacity on the part of our Mahomedan Zemindars for anything like speculation, or attempt to better themselves.

16. In administrating for their future good, and at the same time getting rid of the evils of a deeply rooted system, we must be prepared to make some sacrifice. This need not, however, I think, be very extensive, or of very long duration. We have had ample means and opportunity of noticing how precarious must be the revenue of a district whose fertility depends upon the Indus. We know to a fraction, almost, the return yielded under ordinary circumstances by any product upon a given area, and we have at length seen the market prices return to the average standard of peaceful times in former years, before they had been operated upon by the changes which war has never failed to produce. The present may therefore be said to afford every facility in enabling us to form a right judgment as to the wants of the people, and in framing our system of taxation, which shall call their energies into action, and place it in their power to ameliorate their condition.†

17. The soil does not present the same varieties which we meet with in India.‡ Unless fertilized by direct overflow and deposit from the river, it is rarely culturable above once in every three years, and its adaptation to particular products is not of so permanent a nature as to admit of its being classified, and so assessed. Under these circumstances, a ratable beegotee assessment, fixed after mature consideration of the average yield, the risk of expense attending the culture of the article, its market value, and its accessibility to all classes whose food it forms, appears best calculated to the circumstances of the country.§ .

* Nothing could have been better timed, to teach the Zemindars, long used to be managed by Government in this part of their business, how to manage the business for themselves.—
H. B. E. F.

† I quite concur.—H. B. E. F.

‡ This I much doubt: the varieties in the heights of land, to say nothing of its qualities, strike me as constituting at least as many different classes as exist elsewhere in India.—
H. B. E. F.

§ I quite concur in this, but hardly think the plan proposed below fulfils these conditions.—
H. B. E. F.

18. In substitution* for the present general land-rent for the rubbee fusi, Rs. 2-8-0, with the additional ibwab cess of 2 annas 4 pies, in aggregate Rs. 2-10-4 per beega, I would beg leave to submit the undermentioned rates for your consideration:—

Grains.						Sylabee Bossee Crop.	Well or Chirka Crop.†
						<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Wheat of all sorts	..	..	..	..	..	1 8 0	2 6 0
Muttur..	..	..	..	..	..	0 14 0	....
Gram ..	..	..	..	..	..	1 4 0	....
Sirsof ..	..	..	..	..	..	1 0 0	1 8 0
Ohur ..	..	..	..	..	..
Jamba ..	..	..	..	..	..
Barley ..	..	..	..	..	..	1 0 0	1 12 0
Cheena..	..	..	..	..	..	....	1 4 0

For the peshrus crop, the fixed general assessment is Rs. 1-8-0, with additional ibwab cess 1 anna 5 pies, in aggregate Rs. 1-9-5. The rates now submitted are:—

Grains, &c.						Sylabee Bossee Crop.	Well or Chirka Crop.†
						<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Naglee	..	..	..	..	..	....	1 0 0
Kurrung	..	..	..	..	..	....	1 0 0
Cotton, Neri	..	..	..	..	..	1 0 0	....
Crop Beyla	..	..	..	..	..
Khan Land	..	..	..	..	..
Ditto other land	..	..	..	..	..	1 0 0	1 8 0
Ditto Moondee	..	..	..	..	..	0 12 0	1 0 0
Crop Beyla	..	..	..	..	..
Khan Land	..	..	..	..	..
Indigo, as experiment	..	..	..	..	..	....	0 12 0

* The system here proposed is at variance with the fundamental principle so much insisted on by the Court's directions, that the weight of land tax should depend on the quality of the land, not on the nature of the crops. This is a cardinal rule, and should never be forgotten.

There is this difference with regard to rubbee sylabee land, that it is generally difficult to say beforehand what land will become fit for any particular crop. Good land, which dries early, so as to be fit for sowing, will be used for wheat; lands which will not bear wheat, for jamba, muttur, &c. Thus, on rubbee sylabee lands, the crop becomes an index, often the only one obtainable, of the nature and capabilities of the soil; and in this point of view the system here proposed may be considered the best within our power to introduce.—H. B. E. F.

† As regards chirka rubbee, it may safely be affirmed, that nothing but some inferiority or peculiarity of soil prevents any but the best and most paying crops being sown. Here the usual crop may be a guide to a classification of the soil, which should be made the basis of the assessment.—H. B. E. F.

‡ There hardly seems any reason for making more than one rate (say Rs. 1) for all crops, and leave them to grow what they like.—H. B. E. F.

The present rate on all products for the khureef is the same as that of the peshrus fust above given, with ibwab cess of 1 anna 5 pies, in aggregate Rs. 1-9-5. The following are submitted for substitution:—

Grains, &c.						Sylabee Bossee or Moke Crop.	Well or Chirka Crop.*
						<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Jowaree	..	..	..	..	..	1 4 0	1 8 0
Bajree	..	..	..	..	..	1 0 0	1 4 0
Shalce of all kinds	..	..	..	..	..	1 12 0	....
Simka	..	..	..	..	..	....	0 8 0
Sowa	..	..	..	..	..	....
Mash or Oorud	..	..	..	..	..
Moong	..	..	..	..	..	1 0 0	1 4 0
Till	..	..	..	..	..
Ikkur	..	..	..	..	..
Môte	..	..	..	..	..	....	1 2 0
Sinh (Hemp)	..	..	..	..	..	....	1 8 0

It is submitted that all subshurree or baghaet cultivation be assessed as at present, Rs. 2-12-0 per beega. It may thus be enumerated:—

Sugar-cane.†	Sooa.
Gajur.	Kurella.
Moolee.	Khurbooza.
Shulgum.	Turbooza.
Piaz or Bussur.	Kusheera.
Lussun.	Meeha.
Methi.	Wunga.
Palluk.	Badrung.

And a few others.

Along with these, a few other products have in like manner been assessed, but of less certain culture. For these it is proposed that Rs. 2-2-0 per beega, be assessed, viz:—

Tobacco.	Kashnee.
Bhang.	Mhendi.
Kussoomba.	Dhunnea.
Ujwayan.	Hallia.
Somph.	

19. The pullo or remission has in some measure been discussed in the 7th paragraph of this letter. To the Collector of the time, it appeared the greatest difficulty he had to contend with when he made his seven years' settlement.

20. From the rules laid down by the late Sir Charles Napier in 1846, it

* Here, too, the variety of crops marks a variety of soil. Good land, easily flooded, with good command of water, will grow rice; next to that jowaree, and the inferior class bajree. I see no difficulty in a classification of the land, and assessment accordingly.—H. B. E. F.

† These should be the same as the rubbee chirka rates, which should not be exceeded.—H. B. E. F.

will be obvious that the grant of the remission for failure or loss of crop was surrounded with difficulties. A short extract will suffice to show the view taken of it by Sir Charles Napier,* and the three Collectors: but I deferentially submit that the substitution of loans, as herein proposed, could never have proved a remedy; and that the people who lost their crop, and upon whom the cultivation of the country depended, were not those who are described by Sir Charles Napier as likely to take a trifling loan for the purchase of a pair of bullocks, or in satisfaction of their having paid the full assessment for the land, which had produced nothing:—

Extract paragraph 21 of the Amended Revenue Rules, dated 23rd February 1846.

“I prefer these loans to the custom prevailing in Sind,—that of remitting a portion of the taxes due to the State,—a practice which opens the door to much fraud upon the Government, and which is of doubtful utility to the poor. In each particular case, a war is waged between the individual and the Government, whose agent is trying hard to detect the false pretences set up by the claimants for a remission of their rent, while they, on the other hand, and with infinitely greater facility, combine to prove their distresses. How easily can the destruction of locusts or of inundation be described, and exaggerated, at pleasure, by him and hundreds of cultivators, all interested in making a false statement;—how impossible it is for one lonely Collector to disprove their clamorous assertions, however false! Frauds of all kinds are encouraged by this system, which cannot be at once broken through with either justice or humanity.”

2^d. But the difficulty of converting all into a cash revenue was not then felt, nor was such a measure contemplated. The rules above referred to were only applicable to cash-paying lands, yielding about a tenth of the revenue.

22. There are four chief causes of failure of crop, over which the cultivator may be said to have no control—

1st.—The “tukhmzuddee,” or failure of the seed from want of water, or other causes.

2nd.—The “ghurkee,” from submersion.*

3rd.—The “khooshk,” failure from frost, drought, or other causes.

4th.—The “khuss,” empty husk—from whatever calamity.

The 1st prevails on sylabee bossee land, from dryness or saltiness of the soil.† The 2nd and 3rd are experienced on lands of either very low or high level; and the 4th is attributable to some atmospheric cause, and blight.

23. There is scarcely a village which is not more or less affected by one or other, or all, of these causes.‡ But, as before stated, the only one for which

* Sir Charles Napier's remarks on remissions are most just; but the remedy he proposed was not always applicable, and was generally insufficient.—H. B. E. F.

† These three, therefore, are clearly attributable to variations in the quality of the soil, and liability should then be taken into consideration, in fixing the class to which land belongs.—H. B. E. F.

‡ Clearly showing, that in every village there are great varieties of soil.—H. B. E. F.

pulla has been allowed, is the 2nd or ghurkee, and that upon mahsoolee or ~~best~~ lands only; this has been admitted to the fullest possible extent, even to a ~~hissa~~, or the twentieth part of a beega.

24. But if we reduce the rates of land-rent to the extent already proposed, I am of opinion we may greatly abridge the labour that will devolve on our Native Revenue Officers, in determining the amount of pullo to be allowed.* If every man owning a field were to cry out, as he probably would, that a large proportion of the crop was "be-hassil," or unproductive, and if, on the Kardar proceeding to examine it, it proved to be half a beega, or a beega in extent, the time of a Kardar would be wholly engaged in this kind of work. The granting of a pullo at all, places great power and responsibility in the hands of the Kardar, and I am not altogether sure that his Ameenship will prove so acceptable to the people as that of a less disinterested party would be. It was under the former Government the office of a person who possessed equally the confidence of the Government and the ryots; but the assessments were not those now proposed, but double, and in some cases treble. There were so many elements in that system, operating in so many different ways, for the one party or the other, that it is impossible to adopt it as the basis of any settlement for the present time. It is my perfect conviction, that the introduction of cash-rents, however moderate, without the advantage of the pullo, has had the effect of greatly reducing the cultivation of the country. The complete non-responsibility of the buttai mode of assessment on lands paying rent in kind ensured the cultivation of the most indifferent land; and unless we can now introduce something analogous in its effect upon cash-paying lands, it will be found quite impracticable to keep up the revenues of the country to anything like their former standard. I think the rates above proposed are sufficiently moderate to induce all parties to adopt them, and that the additional inducement, in the shape of the pullo, should in a short time supersede all grain payments. The principal Zemindars show no opposition to it, but the Kishtgars, and actual cultivators, who, after all, are most to be consulted, appear somewhat timid at the prospect.

25. The mode of granting the pullo which I would beg to propose is as follows:—

1st.—That it should only be allowed upon bossee, moke, and sylabee lands.

2nd.—That for all complete loss to the extent of one-third of the field (or kittah), and upwards, pullo be granted upon the decision of the Kardar, or other Officer appointed for the duty.

3rd.—That no pullo be allowed upon chirka, or well, or subsubree cultivation, unless rendered necessary from calamities, such as khussa, or destruction by locusts;† and then at the discretion of the Collector.

* Undoubtedly moderate assessments, duly proportioned to the varieties of the soil, are the ~~the~~ remedy against remissions; but if your assessment be not varied according to varieties in the quality of the land, you will still be called on for remissions on the inferior soil.—

† The usual failure of water, by sudden fall of the river, &c.—H. B. E. F.

26. The reason of my so far excluding the well and chirka cultivation is, that it is seldom affected by ordinary causes, unless from neglect on the part of the cultivator in some shape or other. It has been found advantageous to put a fixed tax upon the chirka, allowing such an extent under each as would prove amply remunerative, all in excess being charged at the usual beegotee rate. This chirka tax must of course vary* according to the size of the chirka peculiar to districts, the productiveness of the land, and be still further regulated by the beegotee assessment which may be determined upon for that description of cultivation.

27. Were I to place upon paper the reasons for all of the above suggestions, it would only be occupying your time by a detail with which you are already so thoroughly acquainted; but if any point should present itself demanding further explanation, I beg to state that I am ready to furnish it.

28. The Fuslee year 1853-54 commencing with the rubbee season, is now too far advanced to admit of a fair trial being given to any new settlement; that for the future it should be an annual settlement will, I think, readily occur to you.† But with regard to the present advanced period of the season, the fact of the rubbee fusl of one year being dependent on the irrigation effected in the previous year must always confuse to some extent the revenue calculations.‡ To make this more clear, the canal excavations, and other works of irrigation, now being carried out, answer for the khureef and peshrus crops of the present official year, and for the rubbee crops of the next year. But for the purposes of an experiment, as this is, and in order that a fair trial may be made, it appears advisable, should it have your concurrence, that the conditions of a new settlement be made known *during* the canal clearing season.

I have, &c.

(Signed) T. R. STEUART, Captain,
Collector, Upper Sind.

Camp Jassun, Collector's Office, 24th January 1854.

(True copies)

J. GILBES,
Assistant Commissioner.

* In other words, the lands must be classified according to the quality, facility of irrigation, &c.—H. B. E. F.

† Certainly, till a more permanent tenure is asked for by the people, as clearly to their own advantage.—H. B. E. F.

‡ No doubt; and the sooner such a system is got rid of the better. All settlements should be by the inundation year, commencing with the khureef sowing, and ending with the peshrus harvest, from the water of the same inundation year.—H. B. E. F.

[Copy.]

No. 325 OF 1853.

REVENUE DEPARTMENT.

To the COMMISSIONER IN SIND.

SIR,

Now that the seven year trial of measurement cash-rents is about to expire, and as a considerable number of the leases will also come to a termination with this khureef 1264, it becomes at once necessary to consider and determine on what arrangements should be made for the future.

2. I may safely assert (and you must be also well aware of the fact), that the cash measurement rents are far from popular in Upper Sind, if not throughout the entire province. The reason is obvious: when these rates were fixed, seven years ago, the value of grain was more than double (I might almost say treble) what it is now.

The fall in price has been gradual ever since the making up of our armies in 1847.

Another cause of the fall may be attributed to the annexation of the Punjaub, and the free intercourse between that country and Sind—a state of matters which did not exist while the former country remained under Sikh rule.

3. In Upper Sind, the third part or Government share of the crops usually grown, such as wheat, barley, gram, jowaree, and bajree, when buttaied, averages from 4 to 6, we shall say 5 cassas. These five cassas are worth Rs. 1-4-0 at the rate of Rs. 15 per kurwar, and Rs. 1 at Rs. 12.

These rates (Rs. 15 for rubbee produce, and Rs. 12 for khureef) are probably fully as high as can be realized at present: how, then, can the cultivators pay Rs. 2-10-4 for the former, and Rs. 1-9-5 for the latter?

4. The leases are also much complained against, and have almost ruined very many of the Zemindars. The fall in the price of grain, and the poverty of the Zemindars obliging them to throw themselves into the clutches of Bunnia money-lenders, may be considered the reasons of their not succeeding. The complaints against leases have all along been very general, and not a leaseholder among them, I believe, that would not gladly return to buttai; but rather than submit to the high rates of mahsoolee, many of the Zemindars in the Larkhana districts have, I am given to understand, intimated a wish to have their leases renewed, and some, I believe, have expressed a desire for leases of eight, ten, and twelve years. I must, however, observe, that (with few exceptions) this was not until they were given distinctly to understand that buttai would not be allowed.

5. Before attempting any new settlements, I should feel obliged by your instructions on the following points:—

1st.—Whether it would be desirable to grant leases of eight, ten, or twelve

years' duration, in the event of the people expressing a wish for them, or to limit them, as formerly, to three and four years.

2nd.—As the cash-rents agreed upon for seven years cease with this khureef, what am I authorised to offer for the future ?

6. The present cash-rents are, in my opinion, much too high, and are the cause of immense tracts of land being left uncultivated. I would not for one moment think of recommending a return to buttai: on the contrary, I would put an end to it altogether, and substitute kasghee instead, as being the better of two evils. I would reduce the present mahsoolee rates one-third, and leave it optional with the cultivators to be assessed in this way in preference to the kasghee. I do not suppose that such a measure would be attended with any falling off to the revenue, for the increase of cultivation would, I feel confident, counterbalance the decrease in the rates of assessment.

7. The low price of grain is the invariable objection to our cash-rents, and leases, and the universal cry is "Buttai!" They even object to kasghee, and say they cannot afford it. I have not been able to account for the objection; for if the fields are measured and valued by respectable men, accustomed to the work, before the crop is cut, there is no further influence on the part of the Government officials beyond recovering and handing over the grain to the purchasers, should the Zemindars themselves refuse to take it at a fair valuation.

I have, &c.

(Signed) R. COWPAR, Lieutenant,
Officiating Collector.

(True copy)

(Signed) T. R. STEUART, Captain,
Collector, Upper Sind.

(True copy)

J. GIBBS,
Assistant Commissioner.

[No. 4—Copy.]

No. 1034 OF 1854.

REVENUE DEPARTMENT.

From the COMMISSIONER IN SIND,

To the COLLECTOR OF SHIKARPOOR.

Dated the 28th March 1854.

SIR,

I have the honour to acknowledge the receipt of your letter No. 33, of the 24th January last, on the subject of the land assessment of your Collectorate.

2. I am glad to find that this most important of all the subjects which can occupy a Collector has engaged so much of your attention, and of that of your Deputies. Lieutenant Cowpar's letter contains some very judicious remarks, and I am glad to concur in your own views on some of the most important parts of this extensive subject.

3. Annexed is a copy of your letter, to which I have, for facility of reference, appended some remarks. The whole correspondence, including Lieutenant Cowpar's letter, of which yours is a continuation, should be circulated for the careful perusal and guidance of your Deputies in charge of districts. *

4. It is quite clear, from what is stated by yourself and Lieutenant Cowpar, as well as from what is apparent as one passes through the country, that the condition of the Zemindars, and of the cultivating classes generally, has not improved under our rule to the extent which might have been expected.

Effects of our Revenue
Arrangements on the Cultivation hitherto.

5. It is even doubtful whether the total extent of cultivation has much increased: there is no evidence of the Zemindars being richer, or much better off, than they were under what we have been used to consider the oppressive rule of the Ameers.

6. To this day, the cultivators' favourite mode of assessment, and that to which they are anxious to revert, whenever they are allowed to do so, is the buttai—a system, the mode of levying which differs little from what is laid down in our Indian Regulation XVII. of 1827, Section V. &c. as that of extreme stringency, to be adopted when the poverty or bad character of the cultivator render it impossible to realize the assessment in the ordinary manner.

7. This fact in itself speaks volumes. It is clearly not, as we are apt to suppose, any blind attachment to an old system, nor any insensibility to what is really best for their own interests, which weds the cultivators to buttai, and makes them object to any fixed assessment. Under

High and uncertain Assessment the true cause of the Cultivators' attachment to Buttai.

the Meers, fixed grain and money-rents (kasghee and mahsoolee) were eagerly sought after, and granted as special marks of favour, and only in the best districts, and to the best cultivators; and there can be no doubt but that they would now be equally prized, if our fixed rents were, like those of the Meers, really the lighter mode of assessment. It is principally because the buttai, oppressive as it is, squeezes from the cultivator what he has, and no more, that it is preferred by him to other fashions of assessment, which exercise an indiscriminate pressure on his resources. This preference is doubtless encouraged by many of our own servants, and others, who find their own advantage in the system; but this would avail little if the cultivator did not find it really less unfavourable to him than the other modes of assessment, which we are in the habit of offering to him.

8. In your own letter, and in that of Lieutenant Cowpar, some of the prominent mistakes of which we have been guilty are noticed. The substitution of buttai for kasghee and cash-rents,—the abolition of the petty emoluments enjoyed by the Zemindar, and the extensive supersession of his agency in the management of the cultivators,—the leasing out the whole country without any accurate knowledge of what we were leasing, or to whom, at excessive rents, and with no provision for keeping accounts,—have been some of our prominent errors.

The first step towards a better System is a definition of the Areas of Assessment.

9. The first step towards the introduction of a better system is to know what are the territorial areas with which we have to deal.

Talookas.

10. The greater part of your Collectorate has at length been finally divided into Talookas.

11. These must now be divided into dehs or villages, and an exact register made of them, which shall not be liable to alteration hereafter—if, indeed, this has not been done already, in compliance with the instructions which have been

Villages.

repeatedly issued on the subject.

12. The “Deh Jahra,” or register of villages, should show how each village is bounded, and who are the principal Zemindars. Nothing whatever can be done till this document is prepared.

Estates.

13. When it is complete, any village may be taken up, and a more minute inquiry may be made, as to the nature and extent of the land, and the proprietary rights in it.

14. Has the village ever been measured? If not, what is the best guess which can be made at its approximate area? What proportion of it is cultivated, what waste? Who are the Zemindars, and what are their respective shares

Information required.

the land? What have they respectively been in the habit of cultivating in each fusi? How many chirkas and wells has each, and what have they paid

to Government in past seasons? What is the character, and usual produce of the land? How is it supplied with water?

15. The information acquired in reply to such questions as these will go far towards enabling us to make a satisfactory rough or preliminary settlement of the assessment, which may last till a better can be introduced.

16. The other duties of a Collector or Deputy Collector will not generally admit of his collecting this information for himself rapidly, or to any great extent; but after a personal inspection of the village lands, much information may be got in a very short time, by assembling the Zemindars, with the Kardar and his records, examining the former *vis à voce*, and referring to the latter as occasion requires; and when this has been done once or twice in the presence of the Kardars, Tuppadars, &c. so that they understand what is wanted, they soon learn how to collect it in readiness, so as greatly to abridge the labour of their European superior.

17. Every settlement must be by inundation seasons—khureef, rubbee, and peshrus, all from the same inundation; the khureef and rubbee, from the same water, must not be disjoined, as is now done. It is quite possible to make settlements on this plan, whether the same course be followed with the year of account or not.

18. No settlement should be made for more than one season, unless at the express desire of the people. The lease was intended to bind Government, and prevent the assessment being raised as the produce increased, or cultivation extended. It was intended to be a safeguard to the cultivator against over-assessment, and not to tie him to an onerous assessment; and if he does not desire such protection, or cannot see its efficacy, it should not be imposed as a condition.

19. Our settlements must be made in all practicable cases with the Zemindar or proprietor, or with the actual cultivator of the soil.

20. The nature of the settlement will vary according to local peculiarities, the amount of information forthcoming, and the leisure of the Settling Officer.

21. In some cases, the Zemindar may be willing to take his village or zemindaree in a lump, and to make the most he can of it; at others to take it subject to a fixed rate in money or grain per beega, or per wheel representing a certain average extent of land.

22. Whatever the settlement, it should be reduced to writing. A copy should be left with the Tuppadar, open to the inspection of all concerned, and another should be given to the Zemindar, so that every man may know when he sows what will be utmost limit of the Government demand on him when he reaps.

Terms to be recorded.

when he sows what will be utmost limit of the Government demand on him when he reaps.

23. This should be done even when the Zemindars will not consent to any settlement. What the Settling Officer thinks fair should be written down, and made known to the people, should circumstances remain unaltered. It will serve for his own guidance in making the annual settlement next season, and meanwhile can be modified, if additional information leads him to think any modification necessary.

24. Under this system, every annual settlement may be an improvement on its predecessor: the buttai of one year may be a lump settlement the next, a grain beegotee the year after, and a money assessment in the next season—as each year adds to the recorded information, and to the means for fixing a fair assessment.

25. You have proposed uniform beegotee rates for the whole Collectorate; but you will, I think, see on reconsideration, that the same rates cannot be suited to the neighbourhood of Shikarpoor and to the wilds of Bordica—to high land and low land; to that which is easily watered, and to that where the watering is expensive; to salt land, and to that free from salt. In fact, I doubt whether the varieties in the productive powers of the soil, taking facilities for watering into account, are at all less in Sind than in India.

26. Some classification you will find necessary, even at starting. It may be at first very general,—as, for instance, a variation in the rates,—so as to meet strongly marked variations in the value of the same kind of land in different Purgunnas. It is not my wish to attempt too much nicety at the outset; but I feel convinced that ultimately you will find it necessary to make several classes, even in the same village.

27. To the general amount of the rates you proposed I have, as average rates, no objection; but you propose that they should vary according to the crop.

Rates to be according to the quality of Land, and facilities for Irrigation; not according to the Crop.

28. This should be avoided, as opposed to the correct principles of assessment, and to the repeated orders of the Honorable Court. It is quite true, as you intimate, that the crop grown very generally indicates a particular kind of land. Thus the words jowaree, bajree, wheat, simka, and rice land, generally indicate five classes of soil, differing in a very marked manner as to their character and facilities for irrigation, and in most cases the crop would be a good guide to the nature and value of the soil, including its “water privileges.” But though it may be well to use the crop as an index of that value, care should be taken to avoid any classification or phraseology which may induce the cultivator to believe that if, by expending money and labour on the simka ground he has taken up, he makes it produce rice, he would be more highly assessed for such rice crop than if he had been content with the comparatively worthless simka.

29. To apply these principles to the rates you proposed. The present

Paragraphs 18 and following.

uniform spring or (rubbee) cash-rate of (cesses included) Rs. 2-10-4 is obviously ill adapted to all kinds of spring crop cultivation. It is seldom complained of when demanded from a good wheat crop, on good well land, but it acts as a virtual prohibition on the cultivation of muttur and gram, on the lighter soils left by the river.

30. You propose for spring crop land naturally irrigated, four rates, and a similar number for spring crops grown on well land. But as the lands best adapted to each kind of crop named are specifically different, the effect would seem the same if you classified the land, and assessed it accordingly in four classes, putting land capable of producing wheat in the first class, and that which will not produce wheat, but only less valuable crops, in the other classes: but there will be this essential difference, that under the latter system the cultivator, knowing what his land is valued at, will have every temptation to make the most of it, and to produce as valuable a crop as possible; while, if his assessment were according to the crop, he would be tempted to lessen his risks, by growing the poorer and lower assessed grains, even on lands which would easily produce the most valuable.

31. Similar examples might be given regarding the rates proposed from other seasons. The rates you proposed for peshrus are all uniform (Rs. 1), with three exceptions. Cotton, on well land, you propose should pay Rs. 1-8-0; but the general arguments against an enhanced assessment on any particular crop apply with peculiar force to cotton. On beila kham land you propose only 12 annas should be taken on cotton; but there the difference is in the land, which will not bear so high an assessment as other peshrus land. As regards indigo, which you propose should pay the same rate (12 annas) everywhere, the principle of not assessing according to the crop will be preserved, and faith will be kept with those who have built vats, &c. in the belief that the lower rate would be levied, by allowing the abatement from the full peshrus rate as a contribution towards such expenses of manufacture.

32. There is one peculiarity of the rubbee sylabce bossee cultivation, that it is often impossible to tell beforehand what kind of land it will be, and when it will be ready for sowing—the two points which determine the crop for which it will be fit. This might seem to render it necessary to be guided by the crop in fixing the assessment. But this difficulty might, I think, be easily got over, as for instance by settling that lands dry enough for sowing by a certain date, giving time for the more valuable crops, should be assessed at the higher rate, while those lands which were so late in drying as to be fit only for quick growing cheap grains should be charged at the lower rate.

33. There can be little difficulty in applying the above principles to

khureef crops, varieties in which are peculiarly characteristic of varieties in soil and facilities for irrigation.

34. There is generally nothing in the natural qualities of soil, or facilities for irrigation, to distinguish land devoted to subsurree or baghaet cultivation from rubbee wheel land. The difference in crop is due to higher and more expensive cultivation, and should not therefore be taxed. The rubbee wheel land rates will probably not be too high for tobacco, bhang, kussoomba, mhendi, &c.

35. I would suggest that you call on your Deputies in charge of districts, as soon as they have read your own and my remarks on the rates, to submit for your approval the rates which they would propose for each fusi in their respective districts. These, when approved or altered by yourself, they may be authorised to declare will be the rates for the coming inundation. But no pledge should be given that they will be continued after that, till they have received the sanction of the Commissioner, to whom the reports should be sent in as soon as possible after they are received.

36. Assessment by wheels, where the wheel may be taken as representing approximately a given area, is a great step towards a fixed assessment, divested of the evils of annual measurements; and where the wheel does so represent a tolerably uniform quantity of land, assessment by it should be conceded, unburdened by the usual stipulation that all above a certain quantity of land per wheel will be assessed extra.

37. Where there is a likelihood that the privilege may be abused by merely setting up a wheel *pro formâ* on land which hardly requires a wheel to raise the water, the privilege of assessment by chirka should not be conceded without some stipulation that the land held under each wheel shall not exceed a given extent without being subject to extra assessment.

38. As regards remissions, the observations of Sir Charles Napier, quoted by you, are very just, but the remedy he proposed can rarely be applicable or sufficient.

39. There is no alternative for remissions, but to make the assessment as light as possible; and even then, where the mass of cultivators is very poor, it will sometimes be impossible to collect the most moderate assessment, and remissions must be granted.

40. The declaration annexed to Major Goldney's cash assessments, that no remissions would on any account be granted, was therefore impolitic—it was impossible to carry out the rule. Its only effect could be to discourage speculative exertion, and to prevent the cultivators making themselves liable for land while a doubt remained whether they could get a full crop. When heavy losses occurred, whatever the cause, we had no alternative but to remit the assessment or buttai the crop.

41. A light assessment will of course greatly reduce the temptation on the part of the cultivator to wish for remissions, and if, in addition to such an

assessment, he knows that he will get remissions for any heavy loss not attributable to his own default, I have no doubt that the effect will be greatly to add to the energy and spirit of speculation with which he will cultivate.

42. Lieutenant Ford has thrown out a good suggestion, that the assurance given by the Collector should be to the effect that where a petition is made in due time, that heavy and unavoidable loss has occurred to a crop, remissions would be given, after examination of the crop, according to what the Collector thought right, or the crop would be buttai'd if the cultivator wished it, in the proportion of half and half, or something much heavier than ordinary buttai. This, if strictly carried out, would effectually prevent groundless applications for remissions.

43. It must, however, be made a *sine quâ non*, that the petitions be presented in time to admit of their justice being tested, and such further measures as may be required taken before harvest.

44. I need hardly point out the necessity for keeping accurate returns of the cultivation in each season. The papers now kept
 Records. are more than ample in detail, but they are comparatively useless from want of system and uniformity, which renders it difficult to combine the information they contain, or to analyze their contents. The Dufturdar of the Commissioner's Office has for some time been engaged in preparing simpler and more uniform forms of returns, which, when completed, shall be sent to you.

45. In your general views regarding the agency of the leading Zemindars, which we have superseded, and their emoluments for service so rendered, which we have curtailed or abolished, I quite concur. Our first step should be to retrace our course in this respect, and to restore to the Zemindars, with some of their ancient duties, a portion of their former emoluments. I shall be very glad to receive from you any plan for giving effect to your suggestions.

46. To the more intelligent heads of villages, we might at the same time entrust, by sunnud, as in India, limited judicial powers, to dispose of such offences as do not call for the intervention of our more highly salaried District Officers; and on this subject also I shall be glad to be favoured with any observations which may occur to you and your Deputies in charge of districts, together with such plan as you may think adapted to carry out the suggestion in your Collectorate.

I have, &c.

(Signed) • H. B. E. FRERE,
 Commissioner in Sind.

Commissioner's Office, Kurrachee, 28th March 1854.

(True copy)

J. GIBBS,
 Assistant Commissioner.

Duties and Emoluments
 of Zemindars.

Vide Regulation XII.
 of 1827, Chap. VI. Sects.
 XLIX. &c., and Regulation
 XV. of 1827.

[No. 5—enclosed in Collector's Letter No. 44, of 4th February 1854.]

Statement showing the Extent of Cultivated Land in the Collectorate of Shikarpoor, during the Year 1852-53.

Name of District.	Khureef.	Peshrus.	Rubbee.	Subsurree, or Land in Vegetable Cultivation.			Baghaet or Garden Land.	Remarks.
				Khureef.	Peshrus.	Rubbee.		
	Beegas Bas.	Beegas Bas.	Beegas Bas.	Beegas Bas.	Beegas Bas.	Beegas Bas.	Beegas Bas.	
Larkhana ..	182,052 2	19,001 18	36,619 15	70 13	103 2	83 11	66 0	
Mehur ..	34,574 8	6,424 12	81,641 16	112 14	169 6	119 3	750 0	
Left Bank ..	11,442 13	8,166 10	139,504 5	500 0	....	2,000 0	2,219 8	
Shikarpoor ..	49,217 0	34,821 0	45,559 0	600 0	412 9	849 15	1,215 8	
Grand Total..	277,286 3	68,414 0	303,324 16	1,283 7	684 17	3,052 9	4,250 16	

Shikarpoor, Collector's Office, 3rd February 1854.

(True copy)

J. GIBBS,
Assistant Commissioner.

(Signed) T. R. STEUART, Captain,
Collector, Upper Sind.

REPORT OF THE COLLECTOR OF UPPER SIND ON THE ASSESSMENT OF THE SHIKARPOOR COLLECTORATE.

[No. 6, with Enclosures A, B, C.]

NO. 402 OF 1855

Revenue Department

From the COLLECTOR OF UPPER SIND

To the COMMISSIONER IN SIND.

Dated 28th October 1854.

SIR,

In replying to your letter as per margin, forwarded to me by Mr. Bellasis, Officiating Commissioner, under date the 17th of April, I have the honour to summarize the state of the question as it was then left, and in doing so, to endeavour to distinguish the points upon which I had, as stated in my letter No. 33, of the 24th January last, been fortunate in anticipating your sentiments, and in endeavouring to give effect to your wishes, from those points whereon I had in a greater or less degree misapprehended them.

No. 1034, of the 28th
March 1854.
Assessment of the Shikarpoor Collectorate.

2. The points upon which I had your concurrence were—

1st.—That the last Revenue Settlement, from whatever cause it might be, had not to any satisfactory extent ameliorated the condition of the cultivator.

2nd.—That this truth was evidenced, not only by the general appearance of the rural districts, but by the fact that the cultivators were then clinging to a primitive payment in kind, of the worst and most fraudulent description.

3rd.—That this attachment on their part was attributable in large measure to a high and uncertain assessment, which had become unsuited to the present state of the country.

4th.—That independently of this, the past Settlement had operated injuriously, in lessening the interest of the Zemindar, and superseding his agency, and in leasing for a term of years lands with whose defects and advantages there were no means of becoming acquainted.

5th.—That pending a scientific survey of the Collectorate, the obvious means of removing the defects last noticed were to define boundaries, whether of estates or district divisions.

6th.—That until this information should be digested and acted upon, no general Revenue Settlement should be entered into for a longer period than

one year, and that this should include crops irrigated by the water of one and the same inundation.

3. With reference to the 1st, 2nd, 3rd, and 4th points above noted, the only elucidatory remark I have to offer relates to the mutual position of the Zemindar and the Hindoo Bunnia. Both the reports of my Assistants, and my personal experience in this Collectorate, as well as in Lower Sind, assure me, that the *real* dealer with the Government in cash settlements is the Hindoo, and that the degree in which the Zemindar objects or accedes to the cash-rate depends, in a great measure, upon his capacity or otherwise to protect his own interests when settling with his Bunnia. In districts which, like Larkhana, have been long partially settled, in which the cultivation, being upon canals, is comparatively free from accident, and in which, moreover, the Zemindar has gradually emerged from his semi-barbarous state, it is found that cash-rates are accepted, and indeed desired.

4. But in tracts where, as in the recently resumed districts on the left bank of the river, the Zemindar is wholly unable to compete with his Bunnia, and where the lands themselves are inherently and annually subject to disasters of every description, the Zemindar will naturally cling to the buttai, because, provided any crop be secured, he never can receive less than the meagre rations allowed him by the Bunnia, while he is free of the money demand which, under a cash assessment, Government make upon him as the responsible party.

5. And it is the verification in practice of this principle which accounts for the apparent paradox that the agriculturist, even when untrammelled by any consideration beyond the present season, prefers surrendering a quantity of grain equal to one-third or one-half of his entire crop (the latter being no unfrequent rate of compact), to paying down an amount in cash, being a light fixed assessment, less in value than one-sixth of that crop.

6. Of course, too, in lands which, like those under the Mehur division, have been subject to repeated disasters, involving heavy agricultural loss, there will exist a strong disinclination to incur even the smallest liabilities by deviating from the buttai system; but this distaste being, with the causes which produced it, of an accidental and temporary nature, I consider that it does not require to be further noticed.

7. Again, during years in which the market becomes, from whatever cause, depressed and unsteady, there will ensue difficulties of an unsatisfactory, but at the same time temporary character. Wheat fell during the first five years of the last Settlement from Rs. 40 to Rs. 9 per kurwar. This contingency has not, however, occurred within the period immediately under notice, as is proved by the rapidity with which grain has been sold at comparatively high and fluctuating prices.

8. The fact of this present steadiness of market is strongly confirmatory of the opinion I hazarded in my last report (paragraphs 13 and 14), to the effect that we had, after many years of fictitious conditions of sale and pur-

chase, at length arrived at a time when, provided no unforeseen event, such as the collection in these parts of a large military force, should occur, we might confidently anticipate a firm and brisk market, with the chances, and even probabilities, of rising prices, to be caused by facilities of intercommunication, and a more numerous population.

9. As regards the 5th and 6th points, I have to state that the few leases which have during the present year been submitted for your consideration have been drawn up on data which, although far from satisfactory, are better in every respect than any before collected; and that in forwarding the deeds agreeably to your wish, care was taken to point out the general character of the area proposed for lease. Much attention has been paid, also, to the subject of the definition of boundaries; and in the approaching cold season my Assistants will be again instructed to bear in mind your instructions relative to the rough surveys of villages and estates. The settlements now in force are for the season, and for one and the same inundatory period.

10. The definition of boundaries, which, as you are aware from my former report, was being carried out in all districts, tuppas, and villages, has been completed in the old districts of the Collectorate; and in view to the prevention of fraud, the saving of labour, and the general advancement of revenue management, the fields also are in process of being defined. The inundated portions of some districts present considerable difficulties in carrying out a similar process, but on all lands characterised as chirka, rice, and moke, in fact all inundated lands, it is found to be of easy attainment.

11. Proceeding to remark upon the points on which I had seemingly failed in apprehending your instructions, I would explain, that in using the phrase "an uniform beegotee assessment," according to crop, I conformed to the phraseology current among the Natives. But my own intention was, that the Government demand should be upon the land, the crops being named as those almost invariably grown upon the different soils.

12. I have now to lay before you the rates of assessment which have been fixed for the current year; and you will, I think, perceive, that while they are leased upon a calculation of the relative values of soils, and take into account the advantages of irrigation, &c. in so far as we are acquainted with, and can estimate those advantages, they moreover have a tendency to press lightly and equably; and while they allow the cultivator, if he desire to do so, to fall back upon a kasghee payment, hold out, on the other hand, the strong inducement of a very moderate cash assessment. The rates then are:—

PESHURUS CULTIVATION.

Upon kutchu bossee land	Rs.	1	0	0	per beega
Upon moke land.		1	0	0	"
Upon well land.		1	0	0	"
Upon chirka land		1	0	0	"

KHUREEF CULTIVATION.

Upon Moke land.

Average quality	Rs. 1 0 0	per beega.
First quality	1 4 0	"
Upon well land	1 8 0	"

RUBBEE CULTIVATION. (Old Districts.)

Upon well land	Rs. 2 4 0	per beega.
Upon chirka land	2 0 0	"
Upon pucka bossee sylabee	1 12 0	"
Upon pucka bossee sek	1 12 0	"
Upon kutcha bossee sylabee	1 0 0	"

In the Resumed Districts, upon the left bank, for

RUBBEE CULTIVATION.

Upon pucka bossee sylabee	Rs. 1 8 0	per beega.
Upon kutcha bossee sylabee, or beila kham	0 14 0	"

13. In the foregoing peshrus and khureef rates it is understood that remission for loss from providential causes is allowed in the event of one-half or more of the field being destroyed; but in view of affording the Zemindar of the New Districts the power of selection between high rates, with remission according to loss (a practice formerly obtaining in these districts), and light rates with remission only under certain conditions, I have promulgated for the rubbee cultivation the following heavier rates, with remission, premising only, that in the event of the Zemindar choosing these latter, he must present any petition of loss before the 15th of March:—

RUBBEE RATES.

Upon pucka bossee sylabee	Rs. 2 10 0	per beega.
Upon kutcha bossee sylabee	1 4 0	"
Upon well land	4 0 0	"
Upon chirka land	4 0 0	"

These latter rates are calculated upon an average crop of the most remunerative grain grown. But as this grain is supposed to be selling at Rs. 20 per kurwar, the absolute demand is less than that prevailing under the Meers, when wheat was more valuable than at present. I anticipate that, affording the Zemindar this opportunity of receiving remissions according to loss, under a higher rate of assessment, will tend towards disposing of the question whether he really does prefer these rates to a lower demand without remission, unless upon failure of the whole crop.

14. Reverting to the khureef assessment, it remains optional with the Zemindar to cultivate by the chirka, paying a fixed sum upon a given maximum extent of land, this extent being dependent upon the usages of the localities so the granting of remission in this case remaining discretionary with Collector.

15. The only other observations which occur to me are, that in view to extending the cultivation of indigo, a remission per beega of 4 annas is granted upon all lands so cultivated, and that in the event of any Zemindar refusing a cash payment, whether for peshrus, khureef, or rubbee, his sole remaining alternative is to submit to a kasghee settlement, the buttai or primitive grain division being wholly exploded in this Collectorate.

16. It is satisfactory to have to state, that while the low assessment now adopted has widely extended cultivation, and so practically demonstrated what area can be cultivated, the result to Government will not be injurious in a fiscal point of view.

17. It will be borne in mind, that the foregoing remarks relative to classification and valuation of soil make no pretension to scientific accuracy; which, indeed, cannot be approached, unless by means of a regular Revenue Survey. I have not as yet received from all my Deputies in charge of districts their observations or propositions for assessment within their charges, although I have reason to know that the subject has had their attention. Lieutenant Pelly, who has had the temporary charge of the districts on the left bank of the river for the last six months, has furnished a very able Report (No. 306, dated the 20th September 1854), which I beg to recommend to your favourable notice, as affording many valuable suggestions for a more complete classification and valuation of lands.

18. I will conclude this Report with a few remarks upon the one remaining point in which I had your concurrence, viz. the revival of the duties, emoluments, and agency of leading Zemindars. These duties naturally divide themselves into those appertaining to agricultural and judicial functions.

19. As relates to the former, I would suggest that I be empowered, during my tour this season, to exercise my discretion in distributing mamool grants for services and periods of time similar to those already continued by you in the New Districts; the ratio of area thus granted to be proportional to that allowed by you. I would beg your early sanction to this measure.

20. As regards the exercise of judicial authority by the Zemindars, I am not sure that they are yet sufficiently advanced to warrant me in recommending confiding to their discretion any powers of this nature. If they are vested with such, the offences and punishments enumerated in Section XLIX. Chapter VI. Regulation XII. of 1827 should comprise all cases to be adjudicated by them.

I have, &c.

(Signed) • T. R. STEUART, Major,
Collector, Upper Sind.

Shikarpoor, Collector's Office, 26th October 1854.

No. 306 of 1854.

REVENUE DEPARTMENT.

From Lieutenant LEWIS PELLY, Deputy Collector, Left Bank,
To Major STEUART, Collector, Upper Sind.

Shikarpoor, 20th September 1854.

SIR,

In conformity with the instructions contained in your endorsement, as per

Future Assessment of the Collectorate.—No. 52, of the 1st June 1854, forwarding copies of letters No. 1034, of the 17th April, from the Officiating Commissioner; No. 1034, of the 28th of March, from the Commissioner; and No. 33, of the 24th of January, from the Collector, Upper Sind, with marginal notes by the Commissioner.

margin, I have the honour to submit what little information I have found opportunity for collecting, upon the points mooted in the correspondence now noted.

2. If I correctly apprehend the general intention of the Commissioner's letter above quoted, the question which he wishes should be answered is this:—

Given, a tract of country known to produce crops of various values, and to be subject to certain accidents: what are the data upon which a fair and equitable cash-rent or tax can be imposed upon any and every jureeb contained within the area of that tract?

3. I am deferentially of opinion, that I shall most plainly submit the few data I have collected on this subject, and shall, at the same time, render any errors in those data easiest of detection, by treating the matter to be communicated *after the following* manner, however incompletely:—

1st.—By enumerating the varieties of soil, together with their apparent advantages or defects.

2nd.—By stating the depths, relative and absolute, of these varieties.

3rd.—By summarizing the general characteristics of these varieties.

4th.—By naming the signs, outward, by which they are commonly recognized.

5th.—By enumerating the accidents to which they are liable—be these accidents the results of the introduction, or proximity of a fresh element; together with the effects of these accidents.

6th.—By reviewing the crops generally grown—this review being intended, not as a means of fixing a tax upon the crop, under the pretence of fixing it upon the land, but as an index to, and test of the values, relative and absolute, of the varieties of soil; and further, as a statement of the particular seasons of the year in which the crops reviewed are grown.

7th.—By noticing the rotation of crops and fallows observed, if any.

8th.—By naming the most profitable crops grown upon the several varieties of soil.

9th.—By naming the largest number of crops which the same jureeb is capable of bearing within one year, supposing the most profitable crops to be grown.

10th.—By submitting estimates of the cost of cultivating a jureeb upon any, and all of the varieties of soil, with the principal crops borne by those varieties respectively, by estimating the average out-turns so produced (Appendix B), the Government shares thereof, the shares of other parties, not being the cultivator, and the net balance and profit remaining with the cultivator.

11th.—By estimating the cash-rent which these jureeb might pay to Government, supposing them to be cropped once a year—this estimate being framed upon the average of all the crops producible by the given jureeb.

12th.—The cash-rent payable as above, supposing one crop, and that the most profitable, to be grown.

13th.—The cash-rent payable as above, supposing the largest number of crops possible, and these the most profitable, to be grown.

14th.—By enumerating the circumstances, such as vicinity to water-carriage and towns, margin for the cultivator's risks, &c. which might operate to modify the foregoing rates.

15th.—By naming the cash-rents demanded up to 1854.

16th.—By particularizing the elements or accidents which, in certain localities, may preclude the practicability, upon sound and definable principles, of levying cash or any other description of payments in the form of a lease for a term of years, and by further particularizing the means whereby the causes so precluding may be removed;—it being assumed in the foregoing data, that it is both consonant with the principles of political economy as applied to India, and with the wishes of Government, that the tax be on the land; that the best crop be produced thereon; and that the Government be bound down by a lease, if feasible.

4. Of the foregoing data, all save No. 14 and that last enumerated have been tabularized in two statements appended to this Report (Appendices A and B), and I venture to hope, that by adopting this plan of communicating details, I

Heads of Information
tabularized.

shall be found to have condensed and presented them in one view, without having rendered that view otherwise than clear, accurate, and full.

5. The calculations contained in these tables assume that wheat and jowaree, the staple rubbee and khureef crops of the districts, are selling at Rs. 20 per kurwar the former, and Rs. 17 per kurwar the latter; these prices being the averages at which those grains have been selling during the past four months. These calculations further assume, that one man with the requisite number of cattle is cultivating one jureeb, and no more. It is clear, then, that these

calculations are based upon assumptions wholly in favour of the cultivator, in so far as they favour either party; because increasing facilities of intercommunication, and other circumstances affecting the case, operate to create a considerable rise in prices at the place of production, while it is very rarely found in practice that one man cultivates one jureeb; on the contrary, an estate is generally tilled by a numerous co-parcenary, and in such event the expenses might be estimated at about one-fourth less than those allowed in the tables.

6. You will observe that in Statement A, I have divided the slope of the Left Bank into certain classes of soil. If I infer accurately, however, there are not different *classes*, but rather one class, namely a clay deposit overlying sand, and in some places overlying rock. This one class contains gradations, and is rendered wholly worthless, average, or valuable, according to the accidental proximity or introduction of two fresh elements, namely sand and water.

7. In view to rendering the foregoing assumptions and the tabular statement clearer, I beg to submit the annexed Rough Section of the Slope, together with a Surface Sketch (Appendix C), and a few explanatory notes, thus:—

8. In the Rough Section, the line A B C represents the level of the bottom of the river; the dotted line T B represents the superior slope of underlying sand; D E is the lowest flood-line, and H F G the highest flood-line; the curved line Y S J K L M N O U V Q denotes the surface slope of the country from the edge of the river bank at O V Q down to the inundated lands of Meerpoor at Y; the perpendicular lines resting upon the base A B C, and touching the points whose letters denote the surface slope, represent the subdivisions which, for convenience sake, have been designated classes of soil.

9. Now, because the line H F G is the flood-level, therefore all lands adjacent to the river lower than that line are flooded; and because, as shown in the Surface Sketch, the floods pour with a considerable fall over Meerpoor, therefore the lands below the same level (at least) are flooded also. *Secondly*, because the floods pour on both extremities of the slope, viz. down the river bed, and down Meerpoor, therefore there will be a tract contiguous to the flood on either side, not inundated itself, but percolated by the flood; and it follows that any high lands that may intervene between the two tracts percolated must, in order to cultivation without rain, be irrigated by means of water artificially raised above their levels. Thus, then, the *one class* of soil is dividable, by the accidental propinquity or introduction of water, into lands inundated, lands percolated, and lands neither percolated nor inundated; and these divisions are in turn sub-dividable according as each particular field may be irrigated, wholly or in part, by any particular instrument.

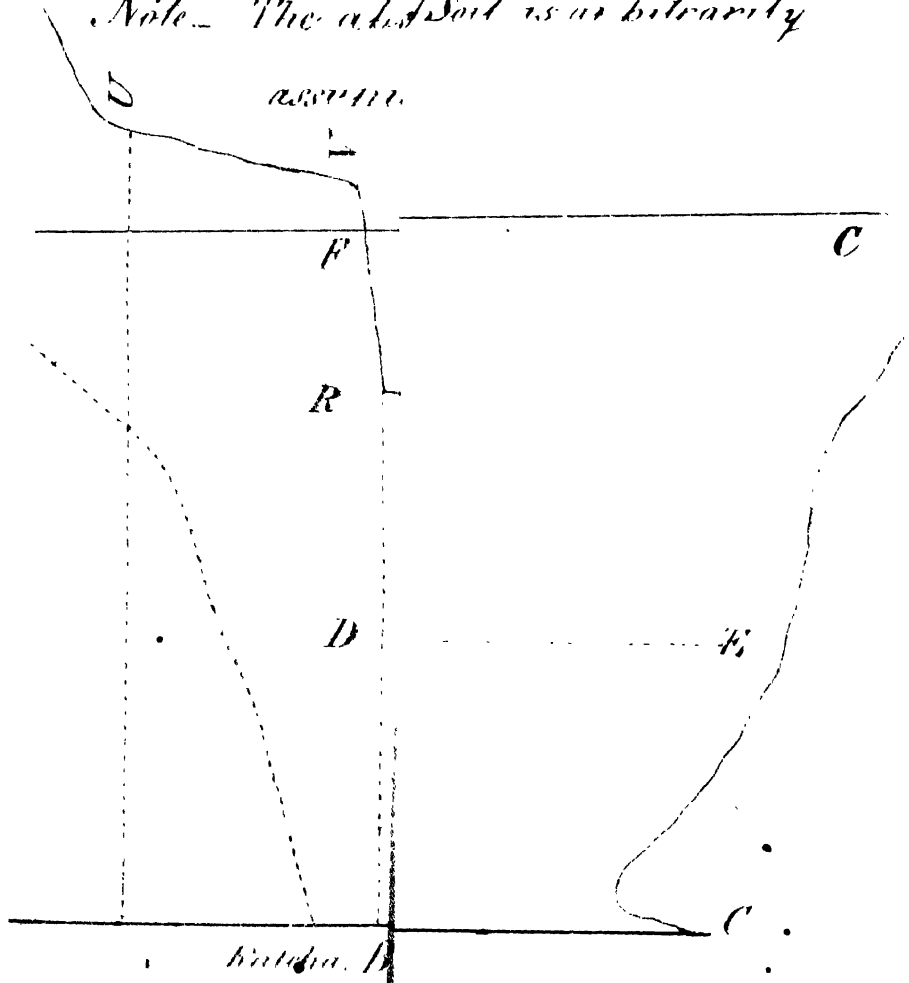
10. Again, it is evident from the sectional plan, that, be the cause that of non-disturbance for a long geological period, or that of the caprice of drift-sand, as yet unoppressed by a superior deposit, or that of the quantity of sediment deposited at some date when the river may have flowed to the eastward ^{7th.} present channel, the greatest depth of soil is found at the lower ext.

Note. The slope Narrah, distant

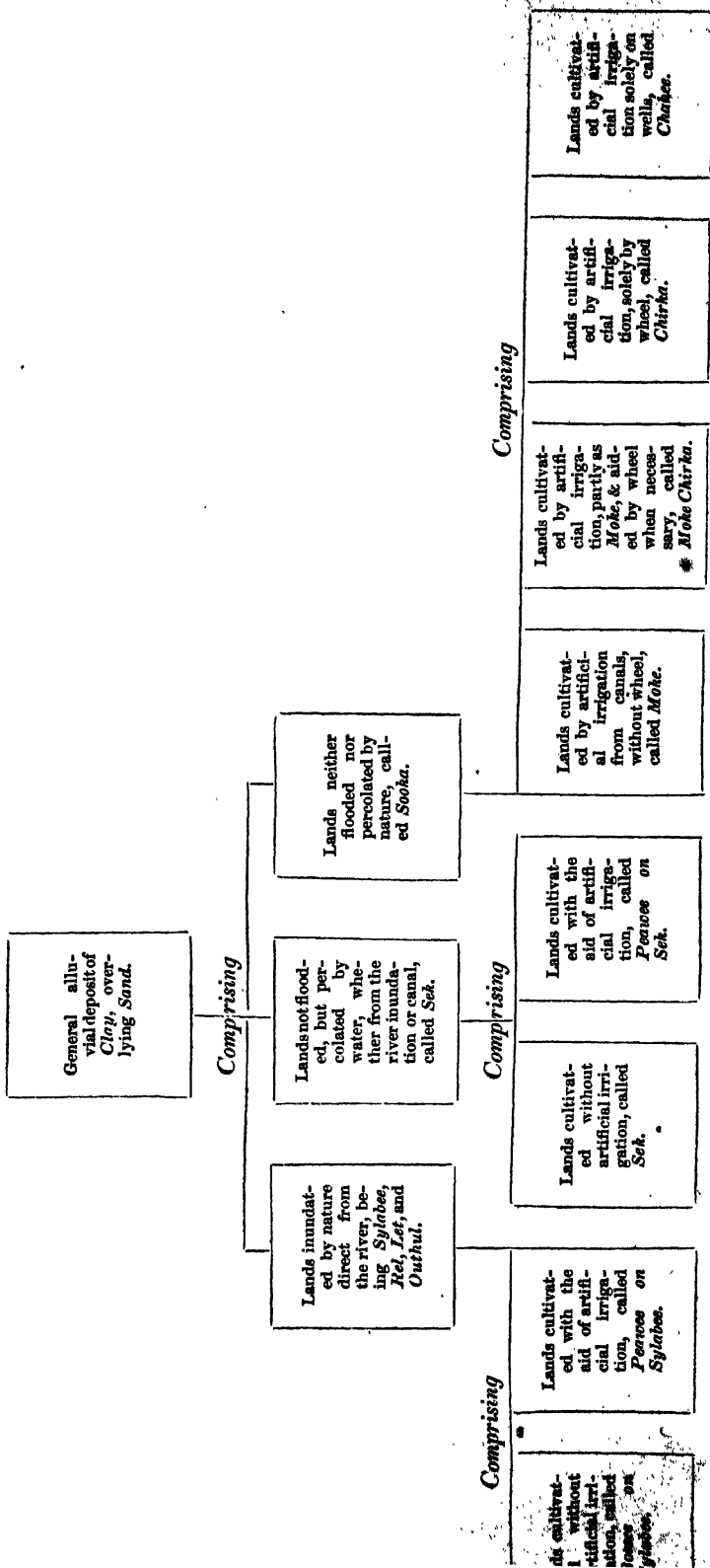
15 Miles, is

Note. The actual Soil is arbitrarily

assumed.



AGRICULTURAL TREE.



(Signed)

LEWIS PELLY, Lieutenant,

Deputy Collector.

of the slope, *i. e.* in the inundated lands of East Gotekee, Oobowrah, Meerpoor, and toward the Narra; and that the sand is nearest to the surface in the division of high land marked "Drummon." In the inundated lands, the soil may average from 8 to 12 feet depth; and in the drummon land from 6 inches to 3 feet depth. There are, no doubt, exceptional instances of the soil being found, in particular localities, 20 feet, and, perhaps, even 30 feet deep.

11. Within the given average limits of 6 inches and 12 feet, experience proves that, other circumstances being equal, the greater the depth of soil the better the crop, and that the larger the admixture of sand, beyond a very small proportion, the worse will be the crop: therefore sand, like water, is found to be an element, whose accidental proximity or introduction to the soil affects the value of that soil.

12. Having, then, these three grand divisions of soil, dependent upon the accidents of sand and water, it is next to be shown how these divisions are found sub-divided according to the degree and manner in which these accidents are approximated or introduced:—

This will, I think, be conveniently exhibited in an Agricultural Tree, which is accordingly annexed; and any obscurities in this Tree will, perhaps, be rendered clear by the following explanatory remarks, which have, however, been already embodied in the Statement A.

13. These remarks should be read in connection, not only with the Tree, but with the Sectional Sketch, in which, commencing from the left hand, at the point Y, you will find the surface slope so far as BB lower than the level of the high flood-line. All this soil is therefore inundated, or *Sylabee*. It is generally a somewhat heavy, stiffish clay, from 8 to 12 feet. It is in process of becoming gradually exhausted, by lying for many months annually under water which leaves no sediment. Its general characteristics are those of the slope generally in all localities where the soil is not less than 4 or 5 feet deep, and where it has not become salt (or "*Shorah*"). These general characteristics then comprise all lands (save shorah) divided in the Sectional Sketch by the perpendicular lines H, KK, BB, S, J, K, L, M, and N. They confer upon all lands so comprised the appellation of "*Khassee*," or good; and they may be enumerated as follows:—That the clay varies in colour from chestnut to a dark brown; is easily worked, but hardish at first ploughing; pulverizes without difficulty, and has more or less a greasy matter, which exudes upon the hand pressing. In proportion as this khassee soil is found dark, easily worked, and greasy, so is its value enhanced. This land spontaneously bears the kunder, uk, and jao trees, and the chubber grass. When exhausted, these disappear, and a kind of jowassee springs up. The cultivators further recognize this land by observing that the earth thrown out of any rat-holes it may contain is in a pulverized state.

14. Reverting to the Sectional Sketch, you will notice, before arriving at BP, there is a "Dund" (*i. e.* natural hollow) marked S, and a dotted line KK, marking the height to which the flood might rise in another year. It is clear

that when the flood should retire, much water would remain collected in the dund J, and of this water the neighbouring cultivators would avail themselves: their cultivation would thus become "*Peawee on sylabee*," while the other lands, remaining unartificially watered, would be "*Bossee on sylabee*."

15. According as the flood would rise to KK or BB, so would the lands be either "*Sylabee*" or "*Seh*," i. e. inundated or percolated.

16. *Sek* land is a belt of land, generally about one or two miles broad, lying adjacent to water, but not itself flooded. It is from 8 to 7 feet depth of soil, and, like the sylabee, will grow a crop without artificial irrigation. But the cultivators at BB would naturally avail themselves of the neighbouring flood, and would accordingly erect wheels, when the crop so grown would be designated "*Peawee on seh*," while the remaining lands would be cultivated merely as "*Seh*."* It is obvious that the sek lands nearest to BB would, as having the deepest soil, and close proximity to the flood, be preferred to the lands lying towards J. S then represents the point to which a thin and sparse population can cultivate; consequently the lands between S and J remain waste. The tract so left becomes "*Shorah*."

17. *Shorah* or *Kuller*, i. e. *Salt*,—in other words the humid clay,—for want of exposure to the atmosphere, throws out a saline efflorescence, and this gradually deepens, until the whole soil becomes a boglike mass, under a salt crust. It is popularly believed that shorah is wholly a result of sek so left waste. But I think this belief is not founded in fact, for shorah is found in high and dry ground around cities. I imagine that it is the nature of the detritus forming the deposit, when not opened up, to become salt, and that this general tendency is greatly increased by the percolation of water.

18. *Mohe* land, or land artificially irrigated by water conducted to it through canals, and then permitted to flood it by means of apertures cut in the glacis of the canal. It follows that this land must be lower than the level of the canal water, which, as it is fed from the river, must be lower than the river high-water mark. But this land, like the sek, is protected by intervening high land from being flooded, laterally, direct from the Indus; while it is itself higher than the flood passing down Meerpoor. J K include the moke lands, and the dotted line above J K represents the canal water-level. The space between K and L is land adjacent to the moke, and which, when the canal should be full, would become in part moke; but as the water began to subside, a wheel would be required to raise the water to the field's level, and thus the land would become "*Mohe chirka*," or land artificially flooded, and then irrigated by wheel. Both these lands being, as before observed, khassee, their general characteristics have been included under the heading "*Sylabee*."†

19. Likewise have those of *Chirka* been so included. This land is bounded

* Called also "*Bossee on sek*."

† There must of course be sek or percolated land adjacent to the canal, but the strip is so low, as scarcely to require separate notice. It usually is cropped with cotton.

by the lines L and M. It is higher than the water-level of its neighbouring canal, from which it is wholly irrigated by means of a wheel.

20. The space contained between M N represents *Chassee* land, or land cultivated wholly on wells. It is chassee, and its general characteristics are those of khassee. It lies so high that it is rarely* naturally flooded, and so distant from the inundation that it is rarely percolated. It is the shallowest of the khassee lands.

21. Between N and O a tract is reached, which derives its distinction as a sub-division of soil, not from the accident of water, but of sand. It is commonly called *Drummon*. It is a hard, poor, light-coloured, sandy clay; very shallow; generally lying high,† never selected for cultivation, since it requires eight-fold water, returns a light crop, and requires to be fallow three or four years after having been once cropped. The moong grass, of which tatties are made, grows wild in this soil; but the kunder tree is very rarely seen in it. When the soil is not deeper than 6 or 8 inches, this land is worthless for cultivation; when the soil is deeper than $2\frac{1}{2}$ or 3 feet, it loses the name drummon, and becomes one of the khassee soils before mentioned.

22. The space between O and U represents the sub-division known as *Dungur*. This is a high, easily pulverized soil, found adjacent to water, which, percolating it, renders it "*Sek*." Being sek, it has a strong tendency to become "*Shoruh*," particularly if allowed to lie unopened to the influence of the atmosphere. That portion of the dungur lying nearest to the water, being the most percolated, has the stronger tendency to effloresce in salt, and thus the dungur lands may be divided under two headings, viz. those close to the water, having a whitish crust of salt, some 2 or 3 inches thick, and an inferior depth of clay of about 5 feet, and those having a brownish surface, or very slight incrustation, and a similar deposit below. The former lands are not valuable; but the latter, when the efflorescence is removed, and they are plentifully irrigated, yield the best jowaree crops in the districts. It is usually sown thick, as many of the seeds dry up.

23. The spaces contained between U V and Q represent the recent deposits left by the river. These lands are known as *Kutchu*, or *Beilu Kham*. When left by the last inundation, nothing is found growing in them unless dandee.‡ They are then called "*Naya kutchu*," and can be cropped only with muttur, simka, and sursoo. If the river continue to leave an annual deposit, it follows that the land remains kutchu. If the river do not leave a fresh deposit, then kash, a species of moong grass, will be found springing up, and the

* To this the sylabee wells of the New Districts form exceptions.

† Although, for clearness sake, the slope has been, in the Section, disposed in a particular order, and with given heights, it is not intended that these heights, and this order, should be received as being those invariably observed by nature.

‡ This "dandee" is a species of jao (Sindee laee), of which there are three varieties—1, growing in shorah land, called "kuller laee"; 2, in khassee lands, called "asree"; 3, in kutchu land, called "dandee."

land will be fit for cotton plantation. If another year the river pass over it, and do not leave a deposit, then chubber grass will appear, and the land will be fit for rubbee crops generally. Of course, the crops on this kutcha land will be bossee, sek, or peawee, according as they may be produced by natural flood, on percolated spots, or by aid of wheel. The soil of these lands is khassee, but their great disadvantage consists in their liability to become at any time mere sediment in suspension.

24. If the data and remarks* contained in the foregoing paragraphs, and in the Statements A and B, be correct, it is evident, I very deferentially submit, that the sole first basis for a classification of soil is to be found in an accurate observation of the manner and degree in which that soil is affected by the accidental proximity or introduction of the elements sand and water, followed by a sub-division of the tract in accordance with the effects of those accidents.

Concise Summary of the
foregoing Remarks and
Data.

* From the foregoing data and remarks the following truths are deducible:—

- 1st.—That the lands within and immediately without the last high flood-line are liable, in any and every future inundatory period, to be left dry or percolated, or to be flooded.
- 2nd.—That this liability implies an annual liability to change of (class) division, and, consequently, that no classification of these lands can be made, with any certainty, for a longer period than one year.
- 3rd.—That these lands, being those upon which the rubbee or spring crops are grown, rubbee leases for a longer term than one year, upon these lands, cannot be framed on sound principles, even although the tract to be leased should be accurately measured.
- 4th.—That sylabee lands, being (unless supplied with canals) wholly dependent upon the flood for cultivation, it follows that the cultivators will, if they have not any in-door occupation, like flax-spinning, betake themselves during the inundatory months to a nomadic or pastoral life, or will remain idle, and consequently become depraved.
- 5th.—That the subsidence of a flood upon cultivated or jungle lands creates, under a hot sun, malaria, and that sylabee districts are, as proved by experience, unhealthy.
- 6th.—That if the flood do not arrive, the lands lie waste, although they regain their strength, and the districts are depopulated by famine or of necessity.
- 7th.—That the circumstances detailed in the preceding deductions tend to unsettle and demoralize the people, a deduction borne out by the criminal returns.
- 8th.—That the cultivation upon sylabee lands being carried on with a minimum of labour and expense, a larger area can be cultivated upon these lands, by a given number of poor labourers, than upon any other sub-division of land, and that this fact tends to scatter population, and to render cattle-lifting easy.
- 9th.—That the cultivation of sylabee lands being cheap, and unlaborious, and carried on by a poor and sparse population, over a wide tract, it follows in probability, that cultivation will be slovenly and in patches.
- 10th.—That the means of reclaiming the cultivators upon sylabee lands are identical with those for reclaiming or improving the lands themselves, viz. to convert these lands into lands requiring for their cultivation artificial irrigation, much and constant labour, and even some skilled labour—characteristics which imply that the cultivators are settled, and upon a comparatively small area; in other words, to turn the sylabee lands and sek into moke, chirka, and chahee, i. e. *leasable* lands. (Vide Appendix for a rough plan for carrying this scheme into execution.)

I am far from presuming to assert that this alluvial deposit is incapable of being classified into various shades and gradations, having each a relative and absolute value; for I doubt not that there will, when scientifically examined in detail, be found to exist numerous grades of soil. Of course, too, vicinity to towns, and in far greater degree, perhaps, to cheap water-carriage, will operate to modify values.

25. But admitting all these minor considerations, what I beg to urge is, that until a scientific survey shall be instituted, and until water-carriage shall, by being rendered proximate, punctual, sufficiently speedy, and uninterrupted, endow the land with a relatively different, and perhaps two-fold absolute value, the accidents which will be found to cause palpable and commonly understood differences in the values of various portions of the Left Bank Districts—districts which, unlike Guzerat, where a red clay lies contiguous with the detritus called cotton mould, consist of a clay deposit overlying sand—are those before mentioned, *sand* and *water*.

26. I beg now to submit a few miscellaneous remarks upon that column in the Tabular Statement A which summarizes the crops grown upon the several sub-divisions of soil; the object of that column being to find a guide in experience to the values of these sub-divisions.

Crops grown, a Test and Guide in the Classification of Soils.

27. As before observed, the soil is deepest in that portion of the Left Bank forming the foot of its slope; and it is natural to assume, and experience assures, that, *cæteris paribus*, the deeper the soil within our given limits, the better the crop. Nevertheless, by turning to the detailed Statement B, it is ascertained that the crops upon this deepest portion are not equal with those grown upon the shallower sub-divisions, viz. Moke and Chirka, which are, in turn, less productive for a continuance than the still shallower lands known as Chahee. And the cause of this paradox is at once discoverable in the manner and degree in which water is applied, and in which labour and art are bestowed. The deep Sylabee lands, lying annually for some months under a flood, which, while it extracts their strength, leaves no sediment, are subsequently in large extent cultivated without manure or artificial irrigation, are slightly scratched, left unwatched, and carelessly reaped. The moke and chirka cultivation requires, on the other hand, considerable labour, attention, and skill; and the chahee, or lands cultivated purely on wells, have no labour spared: * many cattle being required in tilling and irrigating them, manure is plentiful, and the straw is turned to the most profitable account. Water is applied with great care, precision, and skill; and these lands are, moreover, constantly watched and strictly harvested. I may add, that the well lands are almost invariably high, and therefore open to the breeze, which in a hot climate may be a considerable advantage.†

* Water, also, is always at command, applicable both to household and agricultural purposes.

† From the foregoing paragraphs, and Statement B, the following truths may be deduced—truths which might be readily enforced from other data:—

1st.—That the secret of turning, in cultivation, the abundant water to the most profitable

28. Turning, again, to the detailed Statement, it is found that the Drummon sub-division is almost a worthless soil; and the causes are evident, in the large admixture of sand, and in the extreme shallowness of the deposit.

29. In regard to the most profitable crops grown in the rubbee and khureef seasons respectively, wheat is the grain nameable for the former, and jowaree for the latter;* and the detailed Statement shows, that according to buttai rule,† the Government share upon an *average* crop of each of these most remunerative grains would be, when calculated upon a jureeb of all the various sub-divisions of soil, capable of producing these crops as follows:—

Wheat, bossee on sylabce, Rs. 2-14-3.

Wheat, peawee on sylabce, on chirka Rs. 5-0-10½, on chahee Rs. 5-0-10½.

Wheat, on sek, i. e. bossee on sek, Rs. 2-14-3. Because the 5 cassas per jureeb less than bossee sylabce is compensated by less risk.

Wheat, peawee on sek, Rs. 5-0-10½.

Wheat, on chahee, or pure wells, Rs. 5-0-10½. Most valuable, because most certain, and continuous.

Wheat, on drummon, Rs. 1-13-5½.

Jowaree, on moke, Rs. 4-4-9½.

Jowaree, on moke chirka, Rs. 6-1-7.

Jowaree, on chirka, Rs. 4-15-2.

Jowaree, on dungur moke, Rs. 5-8-5. This only for one crop.

Moke chirka, Rs. 7-5-10. This only for one crop.

Chirka, Rs. 6-12-1. This only for one crop.

account, lies in applying it both in respect of time and place in scientific conformity with the requirements of the crop (vide grass crops on water meadows in England, and in Lombardy). This deduction pre-supposes the water to be under control, to contain sediment, and to be conducted artificially.

2nd.—That the crop is rendered valuable at least in proportion with the degree of labour and skill expended in its production.

3rd.—That, given a sufficient depth of soil, say 5 feet, and a maximum of skill and labour, the crop per jureeb will be more profitable than that grown upon a better, because deeper soil, with less labour and skill.

4th.—That without this maximum limit as to depth of soil, or with too large an admixture of sand, no skill, and no amount of water, will avail to produce a paying crop.

5th.—That the sylabce or inundated lands are annually impoverished by the flood. The precise degree in which this impoverishment occurs would form matter for consideration under a scientific classification of the soil's varieties.

* These two crops may be grown on the same sub-divisions of soil; and consequently, both might be produced on one and the same jureeb in one year. Exceptions to the above assertion are, however, found in new kutchā and dungur land, which will not produce wheat, and in drummon, in which land jowaree will not, *I believe*, grow. (?)

† These shares are calculated on the assumption that the terms are of the most favourable kind for the cultivator, viz. that he receives three-fifths of the gross produce.

From the above shares might be deducted, on account of risks to, and wear and tear of all sorts for, dead and live stock, and as encouragement to skilful and laborious cultivation, as follows :—

Chahee, or pure well, 20 per cent.	..	..	..	Rs.	1	0	2
Chirka, 15 per cent..	..	..	..		0	11	11½
Moke, and moke chirka, 10 per cent..				{ Moke chirka.	0	9	9
				{ Moke ..	0	6	10½
Peawee on sek, 10 per cent.	..			{ Wells ..	0	8	1
				{ Chirka ..	0	8	1
Peawee on sylabee, 10 per cent.	..			{ Wells ..	0	8	1
				{ Chirka ..	0	8	1
Bossee on sylabee, 5 per cent.	..	..	..		0	2	3½
Sek, 5 per cent.	..	..	..		0	2	3½
Dungur moke, 10 per cent..	..	..	..		0	8	10
Moke chirka, 10 per cent.	..	..	..		0	11	9½
Chirka, 15 per cent..	..	..	..		1	0	3

30. The balances then demandable upon the undermentioned divisions of soil, as Government tax, per jureeb, would be—

Chahee, or pure well land..	..	..	..	Rs.	4	0	8½
Chirka land ..	..	..	..		4	3	3
Moke chirka ..	..	..	..		5	7	10
Moke ..	..	..	..		3	13	11
Peawee on sylabee..	..	..	..	{ Wells ..	4	8	9½
				{ Chirka ..	4	8	9½
Peawee on sek ..	..	..	..	{ Wells ..	4	8	9½
				{ Chirka ..	4	8	9½
Bossee on sylabee..	..	..	..		2	11	11½
Bossee on sylabee..	..	..	..		2	11	11½
Sek, as before ..	..	..	..	{ Bossee ..	2	11	11½
				{ Peawee..	4	8	9½
Drummon (arbitrary)	..	..	..		1	13	5½
Dungur moke ..	..	..	..		4	15	7
Moke chirka..	..	..	..		6	10	0½
Chirka ..	..	..	..		5	11	10

31. The foregoing method of fixing the assessment,* granting at the same time remissions according to loss, appears to me to offer the following advantages.

* I have rated drummon above its relative value, as a means of deterring from cultivation thereon, unless in particular localities. In the vicinity of considerable towns, Gotekee for example, which is bounded towards the west with drummon, it might be advisable to select this division of soil; but in such exceptional instances, proximity to market would render the rate mentioned not higher than the relative value of the land would sanction.

That the revenue having in these districts been, from time immemorial, generally collected in grain, the cultivators have been accustomed to expect that at least two-fifths of the gross produce would be appropriated by the ruling power, and that the nearest equivalent to this two-fifths (the conditions of the equivalent being a cash payment upon the jureeb), is the money value of these two-fifths, calculated upon the averages of crops, and market prices current.

That as the crops were frequently in nature less, and far less than average, so in the cash payment remission should be allowed.*

That this equivalent, so calculated, and accompanied by remissions, when found necessary, introduces a cash assessment upon the land, without startling the prejudices of the cultivators, or affording them just cause for fearing extra risk from a tax on the land in money;† it being, I submit, by admitting and wisely meeting the habits, customs, and follies of the Natives, and not by opposing these habits, &c. that we must hope to gain their confidence, and lead them to civilization.

That the calculations being made upon the most profitable crops, this method holds out no temptation to the cultivator to grow inferior grains.

That while it makes all due allowances for varieties of accidents, and for the divisions of soil, it holds out sufficient encouragement, in the deduction of a proportional per-centage, to skilled labour and improved cultivation.

32. Before concluding these miscellaneous remarks on this portion of my subject, I would beg to state, that in my observations upon the above method of fixing a land-tax, I allude solely to districts which, like those of the Left Bank, are peculiarly liable to risks, whose scarce half-civilized cultivators have been accustomed to pay in grain, and who are largely in the hands of Bunnias;‡ to whom, I fear, any advantage accruing from a *very light* assessment passes through the cultivator as through a sieve; while any disadvantage accruing from the non-granting of remission, and consequent uneven pressure under a very light assessment, falls upon the cultivator, who is the

* It would, I conclude, be made a *sine quâ non*, that the petition for remission should be submitted immediately upon the loss happening, or in cases of gradual failure before a certain date. The Government local Officer, the Zemindar, and a Zemindar from another tuppa, might then form a punch of remission.

† I am deferentially of opinion, that the cultivator has no dislike to a *cash* instead of *grain* payment, as such, provided only he do not find that cash demand heavier or more unequal in its pressure than the grain collection, and that he be able to find a market for his grain, by selling which he may become possessed of the money to pay his rent,—money which, without such a market, he, a resident in districts possessing scarce any sources of wealth save grain and cattle, cannot possibly realize, unless he borrow, indeed, from the Bunnia, that source of all evils. All, then, that the cultivator requires, is an equally pressing rent, a market, and cheap means of reaching market. But this subject pertains to the Public Works Department.

‡ I hold these agricultural Bunnias to be the curse—perhaps in measure a necessary evil—of the cultivators, whose labours they secure upon terms little differing from those of slavery, whose harvests they forestall, and whose whole profits they engross, while they themselves pay scarce a pie, if one, to the State.

nominal owner of the Bunnia's secret gains, and the party really responsible to Government.

33. You will notice that in the preceding ten sub-divisions of soil to be taxed, no mention is made of shorah or kullur lands, nor of kutchra lands, and that the principal peshrus crops, indigo, cotton, and sugar-cane, have also been omitted.

Omission of particular Sub-divisions of Soil from the foregoing Assessment Calculations.

34. Of the three peshrus crops, one, viz. sugar-cane, is of very expensive culture, and was, as an article of luxury enjoyed in towns where money was in circulation, taxed in cash,* even under the old regime. It is generally grown on well land, and might be assessed accordingly. (Vide detailed Statement B.)

35. Indigo is grown on moke, and cotton on sek, *kutchra*. All three peshrus crops, then, are included in the ten sub-divisions.

36. In respect of kullur (shorah), it is worthless for purposes of cultivation, unless for a thin salt, which is scraped off from spots lying under the shade of the jao, and thrown upon the young jowaree.

37. The kutchra or beila kham lands are so liable to be swamped by any sudden fresh or unexpected return of flood; they are, moreover, of such doubtful duration, that it becomes difficult to calculate their risks. Perhaps 4 annas per jureeb for kutchra left by the preceding inundation; 8 annas per jureeb the second year; 12 annas for the third; and Rs. 1 per jureeb for the fourth year, may be considered an approximation to a just tax upon these temporary lands, which should, however, upon becoming sek, pay Rs. 1-8-0 per jureeb.

38. In respect of new (nowa) lands brought under cultivation (ayta), much must depend, in fixing assessment, upon the accidents of the particular case to be dealt with.

39. If it should be in contemplation to tax the land in conformity with calculations based upon the averages of all crops grown, those averages will be found in the Tabular Statement A; but I am deferentially of opinion, that this method would differ from that already detailed, simply in that it would allow the cultivator to grow inferior grains, while it would considerably diminish the Government revenue, without eradicating, in practice, the necessity for granting remissions.

Average of all Crops used as a Guide and Test for Assessment.

* It should, I submit, be always borne in mind, that under the Meers, the circulating medium in the rural districts was kind, and that the revenue was therefore collected in kind, for reasons similar to those which induce us to collect in cash. But when a crop was, as in the case of sugar-cane, found to be a perishable article, consumed, and in probability cultivated by townamen, holding metal currency, or even by Zemindars of the best class, and coined, cash was immediately levied, and was, indeed, considered an honorable way of paying. When we introduced with our rule large amounts of money into camps, and demanded cash-rents, we changed the medium of exchange in the rural districts, but without, perhaps, affording the cultivators the only means of doing the same, viz. providing a ready and steady market.

40. If it be considered policy to fix an extraordinarily light tax, which any and every sub-division of land can pay, in view of obviating the necessity of remissions, and of benefitting the cultivator without lessening the Government revenue, then it will, perhaps, become necessary to satisfactorily dispose of the three following questions :—

1st.—Does one and the same tax-payer usually cultivate *one* or *many* sub-divisions of land? Because, if he cultivate only one sub-division, *e. g.* sylabee, while a neighbour be cultivating on chirka or chahee, it is evident the pressure of the tax will be uneven, and that the cultivator on sylabee may, in a bad season, be ruined for want of remissions, while the cultivator on chahee becomes unduly enriched.

2nd.—Whether the benefits which under a light assessment are intended to result to the cultivator do really result to him, or whether these benefits are not wholly, or in large and impolitic measure, enjoyed by the cultivator's Hindoo man of business?

3rd.—Whether the agricultural population is numerically equal to compensating Government, by extending cultivation, for the clear loss sustained by Government on the jureeb?

4th.—Whether a very light assessment has not a tendency to encourage slovenly and cheap cultivation?

41. In regard to the 1st question, the “Deh Wan,” which I have recently had made, but which is too lengthy to append to this Report, gives me the following results of lands cultivated in the four Talookas, by Zemindars picked at random from among those enumerated in the “Deh Wan,” with wheat and jowaree, the staple crops upon inundated and not inundated lands, respectively :—

<i>Roree.</i>					Jureeb.	Jureeb.	Jureeb.
Kheir Mahomed Loopia .	..	..	..	..	228	Wheat.	110 Jowaree.
Eesa Boota..	..	..	..	..	56	..	19 ..
Noor Mahomed Boota ..	..	..	..	..	101	..	90 ..
Noor Boota ..	..	..	..	..	70	..	112 ..
Abdoo Boota ..	..	..	..	..	111	..	31 ..

<i>Gotehee.</i>							
Daim and Nuttoo..	..	..	..	..	603	..	.. ..
Goolam Muhomed ..	..	..	..	..	741	..	.. ..
Mahomed Khan ..	..	..	..	..	6,906	..	.. ..
Deh Surbud ..	..	..	..	..	812	..	75 ..
Jehanpgor Deh ..	..	..	..	..	1,168	..	51 ..

<i>Oobowrah.</i>							
Jam Abool Kheir..	..	..	..	..	49,231	..	719 ..
Rarekee Deh ..	..	..	..	..	4,025	..	.. ..

Meerpoor.

					Jureeb.		Jureeb.
Mahomed Khan .. .. .	..	..	..	..	12,023	Wheat.	309 Joware
Hajee Korai .. .. .	..	..	..	..	440	"	" "
Seyd Khan.. .. .	..	..	..	..	751	"	35 Bajree.
Hyat .. .. .	..	..	..	..	20	"	43 Joware
Ahmed Korai .. .. .	..	..	..	..	666	"	75 "

42. From the above, then, it would appear that the great sylabee cultivators are not great khureef farmers, and *vice versa*.

43. My fears in respect of the 2nd question have already been stated in note to this Report.

44. As regards the 3rd question, the last census affords the following returns of the agricultural population :—

Roree, able-bodied labourers	6,27
Gotekee, do. do.	6,13
Meerpoor, do. do.	3,80.
Oobourah, do. do.	3,76
Total..	19,970

And according to the best (atkul or tukmeenori) data which I have been enabled to collect, four able-bodied labourers, with an adequate number of farm cattle, can cultivate annually the undermentioned areas of land :—

In the *Khureef* season, 20 jureeb upon chirka, or 30 jureeb upon moke chirka, or 40 jureeb upon moke.

In the *Rubbee* season, the same four men would cultivate 30 or 40 jureeb bossee, or 4 jureeb upon chahee, or 10 jureeb upon peawee.

In the *Peshrus* season, these men would cultivate 2 jureeb.

45. With the foregoing data, it will be easy to calculate what the total agricultural population could cultivate, and so to anticipate whether, under a given very low assessment, Government could collect from these districts a revenue equal to that which might be anticipated under other systems.

46. You will observe, that in the foregoing calculations I have omitted all mention of an assessment on wheels; and I have so omitted it in view to confining myself to the Commissioner's question, as stated in the commencement of this Report. I have omitted, also, to calculate the expenses of canal cuttings, as these are already cut, and are repaired without expense.*

* It would not, perhaps, be correct to assert that these canals are cut or repaired by statute labour. They form a necessary element in cultivation. They are for the common benefit of the cultivators; and in a province where labour cannot be commanded at pleasure, they must be repaired by those who derive benefit from them. The simplest and most expeditious method is found to be, for a large number of neighbouring cultivators to apply their united energies to these works in succession. The same method is adopted in the far-West, and is called hiving, or swarming. But those free Back-woodsmen of America could not be justly designated statute labourers, although the laws of the community might compel every able-bodied male to swarm.

47. Adverting to the Commissioner's 2nd question, viz. the huks which might be restored to Zemindars, I have the honour
 Huks of Zemindars. very deferentially to submit, that the determination of the particular privileges and rights which the

Zemindars of these districts may at any and all former periods have enjoyed, is a matter fraught with hypothesis, and one concerning which I consider myself incompetent, through want of experience in revenue affairs, and of antiquarian courage, to offer any suggestion that I could assert would, in practice, prove generally and permanently beneficial.

48. Prior to the Mahomedan invasion of Sind by Mahomed Kasim in A. D. 711, these districts were under the superintendence of a Rajpoot feudatory of the Malwa feudality, and at that period the real Zemindar* no doubt partook of the privileges common to his class in that time-honoured race.

49. But when, after the fall of Raja Dahar of Alore, Sind fell through many disasters into the power of the Mussulmans, and when its agrarian population, in common with their countrymen, embraced the faith of their

* It should be borne in mind that this Zemindar, or more strictly Bhoomia (from *bhoom*, the soil), was the allodial proprietor of the Rajpoot feudality. He was the prescriptive holder of land in contradistinction to that class called *Putnich*, or persons holding land upon condition of service (in Europe feud), and liable to assumptions, escheats, and relief fines.

This Zemindar or Bhoomia came, in brief, between the Gola, or Goolam, or Das, i. e. household slave, and the free Rajpoot Giasan. He was *tutissimus in medio* of the three. In other words, he was neither subject to slavery, nor to lose his estate. I speak of *three* classes, because there were no serfs under the Rajpoot feudal system.

Having thus noted the Sind Bhoomia's original position, it remains to note the state of things in which the modern Sind Zemindar was found. It is most difficult to define what the Talpoor dynasty was. So far as I can learn, it seems to have been a kind of half-and-half between the system of Military Officers on detachment, paid by assignments of land among the Mahattas, and the government by feudal military vassals, forming the regular feudal system of Rajesthan and Germany. As among all nomadic (Talpoor) (City of Palms) tribes, the first assignments were, among the Talpoors, made in grain; they were then made in land for one season, and it was not until they began to settle that the grants became permanent, and finally hereditary.

The jagheers (fiefs) were usually to so and so and brothers, or others; in other words, to the Bhraderee, or Bhani Bund, or *Bhyad*, among the Rajpoots. This Bhyad was a kind of frerage, or brotherhood; and I suspect that when an Ameeri gave a fief or jagheer to A, and to A's brotherhood, he intended, not that A should be succeeded upon demise by his brotherhood, nor that the brotherhood should have any direct claim upon the jagheer, unless through A, but that A was to be the holder of the jagheer, and was to *sub-infeodate* or allot certain substance out of it to his brotherhood; and to prevent any dispute in this sub-infeodation, the Ameers usually registered the precise allotments of Bhats (shares, hence Butta).

If the foregoing supposition be right, it follows that the claim of the Bhyad fell with that of the feudatory A. The tenure of A himself was the caprice of the grantee.

In respect of the modern Zemindar, his position will be noticed in the text, where he is shown to have been in a sufficiently precarious tenure; and I will only now add my doubts whether he be the old Bhoomia.

conquerors, they discarded, gradually lost, and ultimately, perhaps, forgot nearly all of the old Hindoo system, whether of Bhoom or what not;* and it would now prove probably as impracticable for a few foreigners to revive the Zemindar's huks or privileges in their ancient integrity, as it has proved impracticable for successive foreign powers to eradicate the Hindoo system in those parts of India where it was found existing in pristine vigour.

At the date of our conquest of Sind, the Zemindar had then long lost all his privileges, unless those dependent upon the despotic will of the Talpoor Ameers, and connected with the soil; and these consisted in his being permitted to claim a certain per-centage upon the grain produced within the area cultivated by men who tilled under his directions, and whom he had probably induced so to employ themselves, and in his being occasionally the recipient of grants of land called mamool, and of presents of honour named loongees.

50. Finding him possessed of some of the advantages belonging to a considerable landholder,asmuch as he collected the rents, was never ousted from his estate, and was supported by Government in the exercise of some authority over his immediate cultivators, we inferred that his lands were allodial. But, under correction, I submit that these few privileges, and many wrongs, which we found attaching to the Zemindar, were a result of circumstances rather than of principle; and I think that the genius of the Talpoor government was averse from the alienation of any land in perpetuity, and from the admission of any permanent right or privilege, whether prescriptive or imprescriptible. Even their greater vassals (Comites), the minor Talpoor and the Belooch chieftains, received, I believe, in the first instance, not land, but simply periodical assignments of grain (seeicee), and were at no time conceded

* If I were an antiquarian, I might here subjoin a very plausible hypothesis, and one which might pass for true, had it not been proved false. Thus, I might suppose the Raja Dabhar to have been an ancestor of the present Abool Khair Dhukee, who still enjoys an eighth of the revenues of Oobowrah, and in whose family the name of Bamboo is common.

And I might assume, that when Mahomed Kasim attacked Dewal en route to Alore, he attacked in fact the Dewal at Dwarka, and that the Indus of those days ran down by the Pooran, and another stream by Omerkote, into the Rumm of Kutch, a tract which still has spots called Beila (or land lately formed). And I might further assume that Kasim proceeded from Dewal to Biahminabad, 10 miles from Shidladpoor, and thence to Nerun (Hyderabad), and thence to Schwan, also called Selam. Thence, approaching the Indus, or western branch thereof, opposite to Raur (Roree), landing with much opposition on the eastern side, close to Raur (Roree), at Bet (still called Bet, or island, also Satee, or Mahomed Kasim's Tomb, because those among his followers who then fell were buried there), that he then took up ground at Gogand, still so called, and visited annually by the Hindoos. That he then, in order to find a ford, in view to crossing the main Indus to Alore, marched south to Dejee, and so round the Gharr Hills, and thus came on to Sagara, still so called, before he saw Alore. This Sagara was a dependency of Jehm (*i. e.* Jeysulmere), whither Kasim finally repaired. It is true that Jeysulmere was not founded till the twelfth century, by Jeysul, a descendant of Bhatti, of the Yahoo race; but of course there was always the famous hill of Jind or Joli, which may have been, in antiquarian logic, synonymous with Jehm.

According to this hypothesis, the "Jam" prefixed to Abool Khair's name was a subsequent addition, when the Zemindars ruled in Sind, after the Dheera had returned from Delhi.

a more permanent tenure than that of a fief (jagheer), liable to lapse both upon the demise of the granter and grantee; and it is not likely that a boon withheld from their own clans would have been granted by the Belooch Ameers to Sindhee Zemindars, unless circumstances rendered so paradoxical a concession temporarily politic.

51. The circumstances which did so operate were the paucity and nomadic character of the population, and the consequent necessity for the ruling power using every endeavour to prevent injury resulting to agriculture—its sole great source of wealth—through emigration of the cultivators, or through a general preference on the part of the latter for pastoral life.

52. The means which naturally suggested themselves, as tending to this prevention of injury, were to induce the agriculturalists to settle, by allowing them, tacitly, undisturbed possession of the lands they might cultivate, and by giving their principal men a per-centage on the revenue, together with occasional presents, whether of land, grain, or dresses of honour. These inducements acted very powerfully upon two organs which are prominent in the Hindoo and Mussulman cultivators—vanity* and avariciousness.

53. But while admitting that, for the foregoing reasons, the Zemindar did in practice enjoy an undisturbed tenure under the Talpoors, it cannot, I think, be doubted, that if with the lapse of time and increase of population the Ameers had discovered that they could afford to treat this class in conformity with the spirit of their rule, they would have ignored any claim on the part of the Zemindar to an allodium; and would have taught him by enforcement that his tenure, rights, and privileges, far from being imprescriptible, were not even on an equality, in respect of permanence, with those of the Belooch vassals, but were rather those of a villain, admitted during the pleasure or convenience of his court to the advantages of a freeman.

54. Such, then, having been the condition in which we found the Zemindar, it follows, I submit, under correction, that any argument, based on a sense of justice, for restoring to him his Hindoo ancestral rights and privileges, cannot be maintained. Any advantages conceded, therefore, to the Zemindar, will be results of free grace or policy. I confess my own ideas tend to encourage this class in every practicable way; and thus to the prejudice of, or at least in preference to, the Jagheendars, whom (and particularly the non-resident Jagheerdars) I hold to be at once the drones of the present community, and the discontented wreck of a lost government.

* The Sindhee has not much pride, but he is very vain. He possesses a surprising development of envy; and if the passion of avarice be excited in combination with that of vanity, a spirit of emulation may be awakened among the Mussulmans, and in a greater degree among the Hindoos of Sind, whose results will appear almost marvellous. In manners, the Moslem has the *nil admirari* tone of the West End; the Hindoo is the City man—quite as vulgar, and, perhaps, more ostentatious: but both lack the qualities requisite for enlarged views. The Hindoo is more led by instinct than by reason, is more acute than sound in judgment and is more cunning than wise.

55. At the same time, I would be very chary in giving even the Zemindars power. They might be, and will be most advantageously granted mamool and loongees, concerning which they display an almost ridiculous anxiety ; and they might, perhaps, be allowed some small judicial authority over their own cultivators, and so spare many minor offenders being taken from the plough to undergo the forms of a civilized trial. There would always be in a thinly peopled district this check on such power so limited, viz. that a tyrannical or unjust Zemindar would lose his cultivators. This judicial authority should not, however, extend to fines, for in such event it would be abused : it might include confinement for a certain number of days or hours.

56. In conclusion, I beg to express the acute sense I entertain of the difficult and complicated nature of the two questions now acknowledged. They are questions upon which I could never have volunteered an opinion ; but being called on to submit my views, I considered it my duty to collect what information I might be able, and to communicate the same.

I have, &c.

(Signed) . LEWIS PELLY, Lieutenant,
Deputy Collector.

(True copies)

J. GIBBS,
Assistant Commissioner.

APPENDIX

Tabular Statement of Data relative to the Varieties or Sub-divisions.

Name of Sub-division.	Depth, Average.	General Characteristics.
1, Sylabec.	From 8 to 12 feet	A rather stiff and heavy clay, in process of becoming exhausted, by annual inundation; is easily worked, but hard at first ploughing.
2, Sek	From 7 to 8 feet.	Percolated, but not flooded by water; becomes salt if left unopened to the atmosphere; is well adapted for growing cotton; its clay similar to bossee.
3, Shorah	All depths	A sterile, generally moist, and saltish clay....
4, Moke	From 6 to 8 feet.....	A stiffish clay, in the neighbourhood of, and artificially flooded by canal water.
5, Moke Chirka ...	.....	This sub-division is a blending of moke and chirka, and will incline to either and both, according to the flood rise and fall.
6, Chirka	From 5 to 7 feet.. ...	A rather tenacious, but easily worked soil, watered by wheel on canal.
7, Well	From 4 to 6 feet ...	An easily worked soil, cultivated continually upon well water. In the New Districts, if the flood reach these lands, the crop is good.
8, Drummon	From 6 inches to 3 feet	A hard, poor, light-coloured, sandy soil, very shallow; generally lying high; never selected; requiring eight-fold water, and yielding a scant crop. When the soil is less than 8 inches deep, it is worthless for cultivation.
9, Dungur.....	From 4 to 6 feet	Is percolated, and so has a tendency to become shorah; that nearest the water has the stronger tendency to become shorah; bears a saline crust, of 2 or 3 inches depth; must be sown thick.
10, Kutcha, or Bonla Kham.	Mutable.	A fresh alluvial deposit; may be inundated on sek, and grow bossee, or pawee, or sek crops; is liable to become mere sediment in solution.

A.

of the Soil available in fixing a Cash Assessment on the Land

Outward Signs by which commonly known	Accident, and their Effects
Colour varying from chestnut to dark brown pulverizes easily, exudes a greasy matter when pressed, the kunder, uk, and joo trees, and chubber grass, grow spontaneously when exhausted, jowassce appears, the earth at the rat-holes is pulverized	If inundated from June to August the crop will probably be good, if the flood remains later the land will lose strength, and the crop be light, but of the same run, the crop is rendered poorer by the aid of wells or wheels in irrigation
Similar to those of sylabce, the soil being khassee.	If cultivated will bear about 5 cusses less than boss sylabce, being adjacent to the flood, is liable to become sylabce by an increased volume of water
By saline efflorescence and the kullur lacc, by a clammy feeling on pressure, its colour is light, and its appearance spongy	The gradual creation of salt renders the land worthless
Similar to those of sylabce, the soil being khassee	If the flood pours scantily along the canal, this land becomes chukka, if the flood fall below its level it becomes moke chukka
Vide Moke and Chukka	Vide Moke and Chukka
Similar to those of sylabce, the soil being khassee	Dependent on cultivation upon the water supplied by the wheel
Similar to those of sylabce, the soil being khassee	The least liable to accidents and consequent failure of all the sub divisions, provided only the wells be kept in repair
The moong grass, of which tattles are made grows wild, the kunder tree is rarely seen it is free of moisture, and sandy	From the absence of water and proximity of sand is the most liable to risk of all inundated lands
Similar to those of khassee, except for a thin saline efflorescence, the date tree thrives on this land.	If left unexposed to the atmosphere, becomes shorah, will tend towards shorah even if cultivated
When left by the last inundation, only the dandee lacc is found growing, it is then naya kutcha, if the river continue to leave annual deposits, the soil remains naya kutcha, if otherwise, the moong grass will appear, and then the chubber grass, when these lands will be fit for rubber crops generally; is khassee soil	Liable to be swept away, to be left dry, to be percolated, to be inundated, or suddenly swamped by a fresh of the river

Tabular Statement of

Name of Sub-division	Names of Crops grown.	
1, Sylabce	<i>Rubbee</i> —wheat, dunneah, saoo, chenah, sursoo, ailsce, gogolow, and metta	<i>Peshrus</i> —0
2, Sek	<i>Rubbee</i> —wheat, muttur, sursoo, mussoor, chenah, moong, jao, and kussoomba	<i>Peshrus</i> —cotton . .
3, Shorah	Worthless for cultivation . . . . .	. . . . .
4, Moke	<i>Rubbee</i> —0	<i>Peshrus</i> —indigo .
5, Moke Chirka	Vide Moke and Chirka . . . . .	. . . . .
6, Chirka	<i>Rubbee</i> —0	<i>Peshrus</i> —cotton, & kutchia
7, Well	<i>Rubbee</i> —wheat, jao, sursoo, tobacco, dunneah, chenah, onions, bangin, kutch, kussoomba, greens, and red pepper	<i>Peshrus</i> —sugar, and cotton
8, Drummon	<i>Rubbee</i> —wheat and inferior grains	<i>Peshrus</i> —0
9, Dimgur	<i>Rubbee</i> —0	<i>Peshrus</i> —0
10, Kutchia, or Beila Khan	1st year—mutter, snika, and sursoo; 2nd year—cotton, 3rd year—rubbee crops generally	. . . . .

Data (continued).

	Rotation of Crops and Fallows.
<i>Khureef</i> —mash, if the flood retire early.	This will crop with wheat for four harvests, each crop becoming lighter; the fifth year shalee will grow; the land must then lie fallow, and if the food cease, it will regain its strength in about two years.
<i>Khureef</i> —mash, and sunka.	Will crop like sylabee, and then lie fallow two years.
.....	Worthless for cultivation.
<i>Khureef</i> —jowaree, bajree, shalee, moong, till, and mash.	Will crop two years with jowaree: afterwards many seasons with rice, but it will require to lie fallow some years after rice before another grain be sown; if indigo follow jowaree, take two moondees of indigo, and then re-crop jowaree for two years.
.....	Vide Moke and Chirka.
<i>Khureef</i> —jowaree, bajree, moong, till, and naglee.	Sow any of these khureef crops for four years; the two first seasons will be good; the two last one-sixth less; if the plough and manure were then applied, the land would regain its vigour; this practice is not, however, followed.
<i>Khureef</i> —carrots, shumleet, moonlee, shulgum, and greens.	Is cropped uninterruptingly; is well manured and looked after; its certainty of crop, its capability to produce so many paying crops of all seasons, its having water at command, and under command, and its exemption from frequent fallows, render this sub-division the most valuable of all.
<i>Khureef</i> —jowaree, and inferior grains.	Will crop one year, if watered sufficiently; must then lie fallow three years; there is no profit in cultivating this soil, save close to towns.
<i>Khureef</i> —jowaree, bajree, and gardens.	Will bear one heavy crop of jowaree, and then lie fallow two seasons; then re-crop jowaree.
.....	Cannot be calculated upon.

Tabular Statement of

Name of Sub-division.	Names of most profitable Crops grown.	Number of Crops producible within the Year.	Detailed Estimate of cultivating a Jureeb, with Shares claimable, &c.
1, Sylabee.....	Rubbee—wheat; * Khu-reef—mash.	If the flood retire early, two crops; otherwise, and commonly one, viz. a rubbee.	As this information will be found in the Detailed Statement Appendix B, it should seem unnecessary to summarize it in this place.
2, Sek	Rubbee—wheat; Peshrus—cotton; Khu-reef—mash.	Commonly only one, and that either a peshrus or rubbee.	
3, Shorah.....	Worthless for cultivation.	.....
4, Moke	Peshrus—indigo; Khu-reef—jowaree.	One	
5, Moke Chirka	Vide Moke and Chirka	.....
6, Chirka	Peshrus—cotton; Khu-reef—jowaree.	One.....	
7, Well	Rubbee—wheat; Peshrus—sugar-cane; Khu-reef—carrots.	Two, viz. rubbee and khu-reef.	
8, Drummon	Wheat, and this zero..	One, if any.....	
9, Dungur.....	Jowaree.	One.....	
10, Kutchu, or Beila Kham.	Cannot be calculated on the 1st year; 2d year, cotton; 3rd year, wheat.	.....

Data (continued).

Estimate of Cash-Rent payable per Jureeb, calculated on the Averages of all the Crops producible, supposing only one of those Crops to be grown annually.	Estimate of Cash-Rent payable, calculated on the Average of the most profitable Crop grown.
Rs. 1-12-0 if a rubbee crop; 10 annas if a khureef.	Wheat on bossee, Rs. 2-14-3; wheat on chirka sylabec, Rs. 5-0-10½; wheat on chahee sylabec, Rs. 5-0-10½.
Rs. 1-12-0, minus the value of 2 cassas; if a rubbee, Rs. 1-8-0; if a peshrus, it would be cotton, and pay cash.	It would only grow one crop, and its most profitable crop would be wheat, as above, i. e. 5 cassas less than on bossee.
Worthless.....	Worthless.
Rs. 1-2-0 khureef; Rs. 3-7-0 peshrus.....	Jowaree, Rs. 4-4-9½; indigo, Rs. 3-7-0.
Vide Moke and Chirka.	Vide Moke and Chirka.
Khureef, Rs. 1-4-0; if a peshrus cotton be grown instead, then vide cotton, Statement B.	Jowaree, if on moke chirka, Rs. 6-1-7; if on chirka, Rs. 4-15-2.
Rubbee, Rs. 2-8-0; peshrus, Rs. 2; khureef, Rs. 1-8-0.	Wheat, rubbee, Rs. 5-0-10½; but more valuable than the chirka wheat, because more certain, and more continual crop.
12 annas.	Rs. 2-14-3 (vide bossee, above).
Rs. 1-8-0.....	Jowaree—moke, Rs. 5-8-5; moke chirka, Rs. 7-5-10; chirka, Rs. 6-12-1.
Not to be calculated upon; rubbee, Rs. 1-10-0; peshrus, Rs. 1-8-0; khureef, 6 annas.	If preserved, it would be similar to wheat on bossee, sek, and peawee.

Tabular Statement of

Name of Sub-division.	Cash-Rent payable, supposing the largest number of Crops possible to be grown.
1, Sylabee.....	Wheat, on chirka or chahee sylabee, Rs. 5-0-10½; mash in khureef, Rs 0-15-4.
2, Sek	As before stated, it will only grow one crop.
3, Shorah	Worthless
4, Moke	Rs. 4-4-9½, or Rs. 3-7-0, according to the condition of the soil.
5, Moke Chirka	Jowaree—moke chirka, Rs. 6-1-7, chirka, Rs. 4-15-2.
6, Chirka.....	Jowaree—moke chirka, Rs. 6-1-7, chirka, Rs. 4-15-2.....
7, Well	Wheat, Rs. 5-0-10½; greens or carrots, Rs. 1 8-0; the fact that it can be rendered sure of two crops contributes to enhance the value of well land
8, Drummon	Rs. 2-14-3
9, Dungur.....	Rs. 5-8-5, Rs. 7-5-10, or Rs. 6-12-1; either of these amounts, according as the jowaree be on moke, moke chirka, or chirka.
10, Kutcha, of Beila Kham	Would vary each year; an estimate has been given for these lands in paragraph 37 of the body of the Report.

Data (continued).

Cash-Rent paid up to 1854.	Cash-Rent paid this Year.
Bossee sylabee, Rs. 2-8-0; chirka sylabee, Rs. 2-8-0; chahee sylabee, Rs. 2-8-0; and 6 per cent. kuruch.	Bossee sylabee, Rs. 1-12-0; chirka sylabee, Rs. 2; chahee sylabee, Rs. 2-4-0
The rubber crop paid in grain, kasghee; the peshrus, Rs. 1-8-0, and 6 per cent. kuruch	The rubber crop paid in grain, kasghee; the peshrus Rs. 1.
Worthless.	Worthless.
Moke, khureef, Rs. 1-8-0; Rs. 2-8-0 indigo, and 6 per cent. kuruch up to 1853.	Indigo, 12 annas; moke, khureef, Rs. 1.
Vide Moke and Chirka.....	Vide Moke and Chirka.
Moke chirka, khureef, Rs. 1-8-0; chirka, khureef, Rs. 1-8-0; cotton, peshrus, Rs. 1-8-0, and 6 per cent. kuruch.	Moke chirka, khureef, Rs. 1-4-0; chirka, khureef, Rs. 1-4-0; cotton, peshrus, Rs. 1-4-0.
Well land, was on the grain, viz. wheat, Rs. 2-8-0.	Well land, Rs. 2-4-0.
If wheat, Rs. 2-8-0; jowarce, Rs. 1-8-0.....	According as it may be cultivated, on chirka or moke.
Vide Drummon, above.....	Vide Drummon, above.
Was not held as a class of land.	If bossee, Rs. 1-12-0; if cotton, Rs. 1; i. e. rubber and peshrus rates.

NOTES TO TABULAR STATEMENT A.

It should be borne in mind, that the best data at present to be collected among the Sindees are distressingly hypothetical, and never more accurate than approximate estimates.

Also, that the cultivating class who are without books, or scientific experience, will, in frequent instances, experimentalize most eccentrically in the practice of agriculture; consequently any general assertions of data must involve numerous exceptions, and even contradictions.

(Signed) LEWIS PELLY, Lieutenant,
Deputy Collector.

The column of Average Depth in the foregoing Statement professes merely to give an approximate estimate of the several depths; but the exceptions are so numerous as almost, perhaps, to nullify the rule.

(Signed) LEWIS PELLY, Lieutenant,
Deputy Collector.

(True copies)

J. GIBBS,
Assistant Commissioner.

APPENDIX C.

EXPLANATION OF THE SURFACE SKETCH, LEFT BANK.

1. The imaginary triangle A B C has its apex A at Kusmore, in the latitude of Bhoong and Bharra. Its base rests along the line of Lieutenant Fife's new cutting, from the vicinity of Roree to the Eastern Narra.

2. From A to B is 80 miles, and the general slope or fall of the bank towards B may be 9 inches per mile. From B to C is 13 miles, and the fall to the bank of the Narra at C is say, at least, 1 foot per mile. A C being the hypotenuse of the triangle A B C, any water running from A to C must have a fall at least greater than that of 80 miles, at 9 inches per mile = 720 feet, + the fall from B to C = 13 feet; and any water flowing down the depression lying along Meerpoor Talooka, and so into the Narra, must have a fall of 720 + 13 + the depth of the Narra. The Bhoong and Bharra flood does flow from A to C, and into the Narra.

3. This flood comes over at the depressions coloured red in the Sketch—depressions which were shown on a large scale in my Report as per margin. Its powerful flow upon first leaving the river renders it perhaps impossible to offer any permanent artificial resistance to it. If, then, it should be considered advisable to turn at any future date the Talooka of Meerpoor into a khureef growing district, or if it should become necessary to reunite its present sylabee lands, by allowing them to remain unflooded for a certain number of years, the only method by which these ends could be, without enormous expense, secured, would be, perhaps, to allow the flood, after leaving the river at Bhoong and Bharra, to flow for such distance as might be necessary to lessen its force by expansion and distance, and then to gradually confine and turn its volume in the direction of the depression X Y Z, V, by means of a series of bunds—*a, b, c, d, e, f, g, h*. The bund *a*, which would be the first to be met by the flood, would offer, you will perceive, scarcely any resistance, while it would still tend to give the water a direction towards the depression; a tendency which would be continued and increased by *b*, and so on until the flood should find itself flowing down the depression. Of course any branch depressions would have to be bunded, or otherwise secured.

4. The effect of this scheme, if carried out, would be to slacken the pace of the flood between the river and the bunds, and to increase the pace after the water had reached the depression.

5. The flood, so slackened in pace, would deposit a proportionably increased

amount of sediment near the river bank. This would naturally elevate the bank, and tend to force back the river to adhere to its main channel.

6. The flood, flowing more rapidly down the depression, would deepen that depression, and define it, and would throw a larger volume of water into the Narra—an object much to be desired.

7. The result would be, in the course of time, either that there would be a defined river running from the bunds, or indeed from Bhoong and Bharra, into the Narra, and so down to Luckput; or that, if the additional setting arrested the flood at the river bank, the districts of Meerpoor, Oobowrah, and East Gotekee would be convertible into khurceef lands.

(Signed) LEWIS PELLY, Licutenant,
Deputy Collector.

Shikarpoor, 22nd September 1854.

(True copies)

J. GIBBS,
Assistant Commissioner.

[No. 7.]

No. 3374 OF 1854.

TERRITORIAL DEPARTMENT,
REVENUE.

From the COMMISSIONER IN SIND,
To the COLLECTOR OF SHIKARPOOR.

Dated 11th November 1854.

SIR,

With reference to your letter noted in the the margin, I have the honour to request that you will embody in a series of Rules the propositions you suggest for adoption in the assessment of your Collectorate, and request Lieutenant Pelly to do the same with regard to the suggestions contained in his very able and interesting Report.

No. 402, of the 26th ultimp, on the Land Assessment of the Collectorate.

2. The Rules should be as clear and succinct as possible, and framed so as to admit of their being, when sanctioned, embodied in a notice (Ishtahar-nama) for general information.

3. The measure proposed in your 19th paragraph, for the grant of mamool allowances to Patels, is sanctioned for the coming season, as an experimental measure: the permanency of the system must depend on the sanction of Government.

4. Where you think it preferable, the reward to the Patel may be given in the form of a loongee, never exceeding in value what would be allowed as the value of the mamool. In such cases it should be charged, and shown in the village accounts among the village expenses.

I have, &c.

(Signed) H. B. E. FRERE,
Commissioner in Sind.

*Commissioner's Office, Camp Joongshai,
11th November 1854.*

(True copy)

J. GIBBS,
Assistant Commissioner.

[No 8, with Enclosure.] No. 468 of 1854.

REVENUE DEPARTMENT.

From the COLLECTOR, UPPER SIND,
To the COMMISSIONER IN SIND.

Dated the 18th December 1854.

SIR,

With reference to your letter No. 3374, of the 11th ultimo, requesting me to embody in a series of Rules the propositions I would suggest for adoption in the assessment of this Collectorate, I have the honour to submit a Report by Lieutenant Pelly on this subject, together with a draft of such Notifications as have been issued by me during the past years, in fixing the assessments of the different seasons, and a few Rules for guidance in making lease settlements.

2. I have experienced much difficulty in getting our Native agency to assist much in proposing any system of classification of lands, or in the attempt to make any proposition for assessment on this principle; and the rates fixed in my notifications have been given more as a guide in showing our Native officials to what extent the reduction might be carried out, and in what manner it was proposed to modify former practice, than as a standard measure of taxation to be adhered to.

3. These rates could not therefore be altogether equitable, for every description of land is susceptible of sub-division, and is assessable at different rates. But what has been done has been so far useful, that a few annas more per beega, or a few less, can make no material difference; and it will lead, I trust, in the absence of more scientific aid, to a general valuation of the land.

4. This valuation is now in progress, and in many of the districts it will be completed in time for the next khuceef season. It will be evident, therefore, that the publication by Istiar of the Rules now submitted for your inspection, would not be applicable to the coming seasons. It will, I hope, be in my power soon to forward what I would propose.

5. I might have forwarded translations of these Rules, as they are all in my office, but under the above explanation, they may not be required. If, on perusal of these Rules, you should observe anything objectionable, I shall feel favoured by your instructions.

I have, &c.

(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

Shikarpoor Collector's Office, Camp Nusseerabad,
18th December 1854.

(True copy)

J. GIBBS, Assistant Commissioner.

NOTIFICATION.

SHIKARPOOR COLLECTORATE.

The seven years' settlement which existed in this Collectorate having expired with the rubbee crop 1264 (1853-54), it becomes necessary to make a new settlement for the ensuing Fuslee year 1265 (1854-55).

2. This, it is proposed, should for the future be done annually, or for such number of years as may secure a fair measure of profit to the cultivator.

3. Buttai is regarded as the worst and most demoralizing mode of assessment for the people of the country, and the total abolition of such a system is desired by the Government. Such parties, therefore, as may be averse to any other kind of assessment, must pay one-half of the gross produce in buttai, as was the custom in the time of the Meers. This system is therefore abolished, and will on no account be allowed, unless in exceptional instances of unexpected providential calamity.

4. The Government wish cash-rents to be paid, and are willing that these should be sufficiently moderate to allow the cultivator an equitable profit for his labour, his skill, and his outlay in stock, &c. With this object, the Zemin-dar, on receipt of this Notification, will make known to the Tuppadar or Kardar of the district, whether he will pay mahsoolee or kasghee (*i. e.* Dand Bunde "Bu-mooja Nuzudeed Rukule Sirknee") on the beega.

5. All ibwab cesses on the crop are abolished.

6. The mahsoolee rates are as follow :—

For the Rubbee Fusl.

On well land, without reference to or distinction of crop....	Rs.	2	4	0
On chinka land, ditto ditto ditto		2	0	0
Bossee land, capable of producing pukka crop (zumeen abad bina pukka)		1	12	0
Ditto, kutchia crops (zumeen abad bina kham)		1	0	0

7. The following are the rates for the *Peshrus Crop* :—All lands, without distinction of crops, will be assessed at Rs. 1 per beega. The culture of indigo being attended with the expense of vats, and its extension being an object of importance, a remission on this outlay of capital for a definite period is necessary. A remission of 4 annas per beega for five years has been fixed. But for all other products, such as cotton, sugar, and a few light grains, the full assessment of Rs. 1 is to be levied. The assessment called Kinare-poke, which has been charged in the rubbee fusl in addition to peshrus rent, on sugar land, is reduced to one-half, viz. Rs. 1-2-0.

8. For the *Khureef Fusl*, the undermentioned rules and method of assessment are ordered :—

1st.—All chirkas to pay a fixed assessment, without reference to extent of land irrigated (Bilmooktee Buttoor Wajubee) in accordance with local custom and capabilities of the soil, modified at the discretion of the Collector.

2nd.—All hoorlas to pay half of the chirka rates, and on the same terms.

3rd.—Chirka and hoorla irrigated lands, aided by moke water, exceeding a standard area, which shall be fixed according to classification of land and local custom and usage, are to pay Rs. 1 for every beega of such excess.

9. All who may be averse to the above three rules will have the option to cultivate lands, whether watered solely by wheel, or combinedly by wheel and moke, at the rate of Rs. 1-4-0 per beega, for every description of crop, and such as are wholly moke lands will pay Rs. 1 per beega.

10. Rice lands will be assessed at Rs. 1-4-0 per beega.

11. Well lands will pay Rs. 1-8-0 per beega.

12. Zemindars are expected to agree *in toto* to the cash-rent system. They will not be permitted to avail themselves of any one rate, and to decline assent to the others within the same village. It will be obligatory on them to agree to each and every of the rates specified. Such dehs as decline their acceptance of the abovementioned terms will be brought under the kasghee mode of assessment, *i. e.* at an average of so much grain per beega.

13. The Napier gunda, or land measure now in use, and no other, will be continued.

14. The bilmooktee, or contract rates above fixed, upon chirkas and hoorlas, do not admit of remission (pullo) being claimed by the cultivator for partial loss of crop. The fixed rates will be sufficiently low to obviate the necessity for this. Cases of total loss of crop from providential cause, and not from any fault of the cultivator, may, however, be considered as fit instances for pullo, and will be considered by the Collector.

15. Cultivation by chirka, hoorla, and moke, taxable at the rates of Rs. 1-4-0 and Rs. 1 per beega, as above laid down in paragraph 9, also that upon rice lands, paragraph 10, and peshrus crop, paragraph 7, are subject to pullo for losses, to the extent of one-half of the field or kitta; but for less than the one-half, or for fractional parts, none will be allowed.

16. Lessees, the periods of whose contracts do not expire before the introduction of the new system, may collect their dues at any rates they choose, on condition that they do not exceed those stipulated in the agreement. They will be bound to pay to Government the amount agreed upon. Such as have taken leases from Rubbee Fusi 1265 will be allowed to collect their dues at the fixed Government rates of the day, or under these, at the discretion of the lessee.

17. It is hoped that all Zemindars will make themselves acquainted with these Rules, and that they will take on hand every description of cultivation, whether by chirka, hoorla, bilmooktee, or moke, at the rates of assessment

here stated. They will find that the system now to be introduced will be unattended with the trouble and vexatious annoyances of the buttai system, and the more land they bring under cultivation, the more will they benefit by it.

18. Should the Government officials, in the realization of the Government demands, deal with them in any way unbecomingly, they should at the time bring the same verbally or by petition to the notice of the Collector or his Deputies.

19. The division of village lands into square fields is one of the first objects requiring the Revenue Officer's attention. Lands cultivated in moke, sylabec, or even chirka, whether held in teka or in amanee, should be so arranged. Were low lands, ditches, or other marks, established as field boundaries, the estimate of crops will be facilitated. It would induce a chuckbundee settlement, which would relieve both the Government official and the cultivator from the annoyance of annual measurements of crop; it would also facilitate remissions for loss of crop where occurring, but which, under present circumstances, it is impossible to allow.

20. An imaginary plan of a village sub-divided in the manner abovementioned is appended, for the use of Native officials.

Rules relative to Leases.

1. Any Zemindar desirous of holding land in lease for a term of years must, during the month of October, forward his petition to the Deputy Collector of his district, stating whether his land solicited in lease be sylabec, or canal or wheel irrigated land, and that he is prepared to pay wholly in cash.

2. If the land be purely sylabec, the Deputy Collector will at once negative the petition; because lands of this class, being dependent for their agricultural worth upon accidents of an incalculable nature, any contract entered into for leasing them is a mere gambling transaction.

3. If the Zemindar declare his land to be canal or wheel irrigated, or to be capable and ready to be so cultivated, provided the flood do not inundate it, then the Deputy Collector will instruct the Native local official to submit the following heads of information, in the appended Form A:—

1st.—The area which the petitioners pray to hold in lease.

2nd.—The extent upon which wells, canals, and all irrigational appliances are in good order, and fit for use.

3rd.—Whether this extent, or any portion, be dependent wholly upon artificial irrigation, or whether any, and if any what, extent is from time to time liable to inundation.

4th.—Whether this extent has been carefully estimated, and whether the boundary-marks of fields, &c. have been erected.

5th.—Who the Zemindar's Hindoo man of business is, and whether he be willing to become for the term of the lease a recognized partner with the Zemindar as lessee.

6th.—Whether the accounts of this land have during the past four years been kept by Government officials, or by the Zemindar's Hindoo, and what has been the annual out-turn of the land upon the lands characterized in Rules Nos. 2 and 3.

4. In submitting the foregoing form to the Deputy Collector, the Kardar is to enter, in the column set apart for his opinion, any remarks he may have to make relative to the former assessment, to causes of increase and decrease of cultivation, the Zemindar's character, the number of hands he employs, &c. ; but the Kardar is not to offer suggestions regarding the new assessment to be fixed.

5. After receiving the Kardar's report, the Deputy Collector will, while on circuit, take any favourable opportunity of personally—and accompanied by the Zemindar, the Tuppadar, and if convenient the Kardar—visiting the land in question, determining whether the irrigational works are in good repair, and all other necessary particulars, and then appending his own opinion in English as to the advisability of, and terms upon which the lease should be granted.

6. Both the Deputy Collector and Kardar will avoid the insertion of fractions of rupees in their final estimates. The Deputy Collector will also be careful, in cases of renewing leases, to make the deduction of 5 per cent. commonly known in leases as “Kuruch,” not upon the total jumma, but upon the Izafah jumma. He will on no account include in the area recommended for lease the land unfurnished with available canals or wells, if such land exceed 800 beegas.

7. In localities affected by the capricious changing of the river's course, the Deputy Collector will be careful to explain to the Zemindar the Rules regarding diluvion and alluvion, as laid down in circular endorsement No. 1097, of the 13th May 1852, and the Zemindar's stipulation to abide by the Rules in question must be entered in the Kuboolzat.

8. The Deputy Collector will require the presence of the Zemindar's Hindoo man of business when inspecting the land, will obtain from him all possible information regarding it, and will at his discretion recommend, or otherwise, its being made a condition of granting the lease, that the Bunnia be a recognized and responsible party thereto.

9. In going over the land, the Deputy Collector will point out to the Zemindar, or will arrange in his presence, the particular localities upon which trees might be advantageously grown, or canals be cut, or wells dug, or bunds erected ; and these works may then be entered and recommended on a separate document, or they may be left to the Zemindar's own sense of self-interest.

10. The Zemindar's signature or mark is to be attached to all the documents forwarded by the Deputy Collector, and no lease is to be submitted unless the Deputy Collector has personally communicated thereon with the Zemindar, and, if possible, visited the land.

11. The Collector, in turn, will forward the documents countersigned, and with an opinion recorded in English, to the Commissioner, who will confirm it or otherwise.

12. But every lease must commence from the peshrus, *i. e.* with the water of any given inundation; it must never be for a longer term than four years; and it must remain optional with the Zemindar to throw it up at the close of any rubbee season of the four years—that is to say, his petition to throw up must be forwarded to the Deputy Collector before the 1st November, and the lease will then be considered as closed with the rubbee crop then growing.

(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

(True copy)

J. GIBBS,
Assistant Commissioner.

A.

Statement of Lease.

Talooka	Deh	Peer Bux.	Teha.	Jumma of last Year				Hyssut of Revenue, realized by the Lessee or by Government for previous Years					Average Annual Profit		Average Annual Loss		Area of Deh.				Total
				Grain paid as Rent	Value of Grain	Cash paid as Rent	Total Rent	Year	Grain	Value of Grain	Cash	Total.	Cash	Grain	Cash.	Cultivated.	Cultivable	Uncultivable			
Mehur.	Hubblech.				1,000	1,000	1,000	..	..	1851-2	1,200	1,200	..	..	..	..	..	..	..	..
										1852-3	1,300	1,300	..	..	..	..	..	..	..	..
										1853-4	1,500	1,500	275	..	..	700	500	300	1,500	
										1854-5	1,100	1,100	..	..	..	..	..	..	..

The particulars cited in the 3rd paragraph of the Rules for Leases should be appended to this Form of Statement.

(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

(True copy)

J. GIBBS,
Assistant Commissioner.

No. 347 of 1854.

REVENUE DEPARTMENT.

From Lieutenant LEWIS PELLY,
Deputy Collector, Left Bank,

To Major T. R. STEUART,
Collector, Shikarpoor.

Beg Manjee

SIR,

In acknowledging your endorsement No. 941, of the 21st November 1854, I have the honour to remark that my former Report on the Land Assessment of these Districts professed only to "acknowledge," not to answer, the Commissioner's question relative to this most complex and widely ramifying subject; and in doing so, submit "the few data" I had found opportunity for collecting. These data assumed the commonly understood accidents, sand and water, to be in greater or less degree the causes of the alluvial deposit forming the Left Bank being dividable and sub-dividable into areas of various values; and my main intent was, by a simple and methodic analysis of the districts so affected, and by a review of the crops usually grown on the several subdivisions of areas, to facilitate an apprehension of those broad distinctions that will probably serve as a kind of elementary basis for a more minute and scientific survey.

2. But I by no means ventured to hope that the several amounts there assigned to the different sub-divisions could be *now*, and equitably demanded by Government. They were rather the nearest approximations which I could make to estimates of the absolute amount per jureeb that each and every sub-division might yield as revenue, under the conditions, and in so far as each sub-division might be affected by the data, contained in my Report. But these data are far from comprehending all the circumstances creative or destructive of value in soil, and even the conditions (*viz.* the assumptions of price of grain, proportion of gross produce to be claimed as Government's due, and amounts of per-centage to be allowed for skilled labour, wear and tear of dead and live-stock) were, as being based on inaccurate* information, in some degree hypothetical.

3. The amounts or rates named by me differed from those now obtaining in this—that they took into consideration the accident sand, whereas the latter are, I respectfully submit, based only upon the accident water. The conse-

There is a great difficulty in Sind. The Natives are utterly ignorant and indifferent regarding the meaning and importance of the word "accuracy."

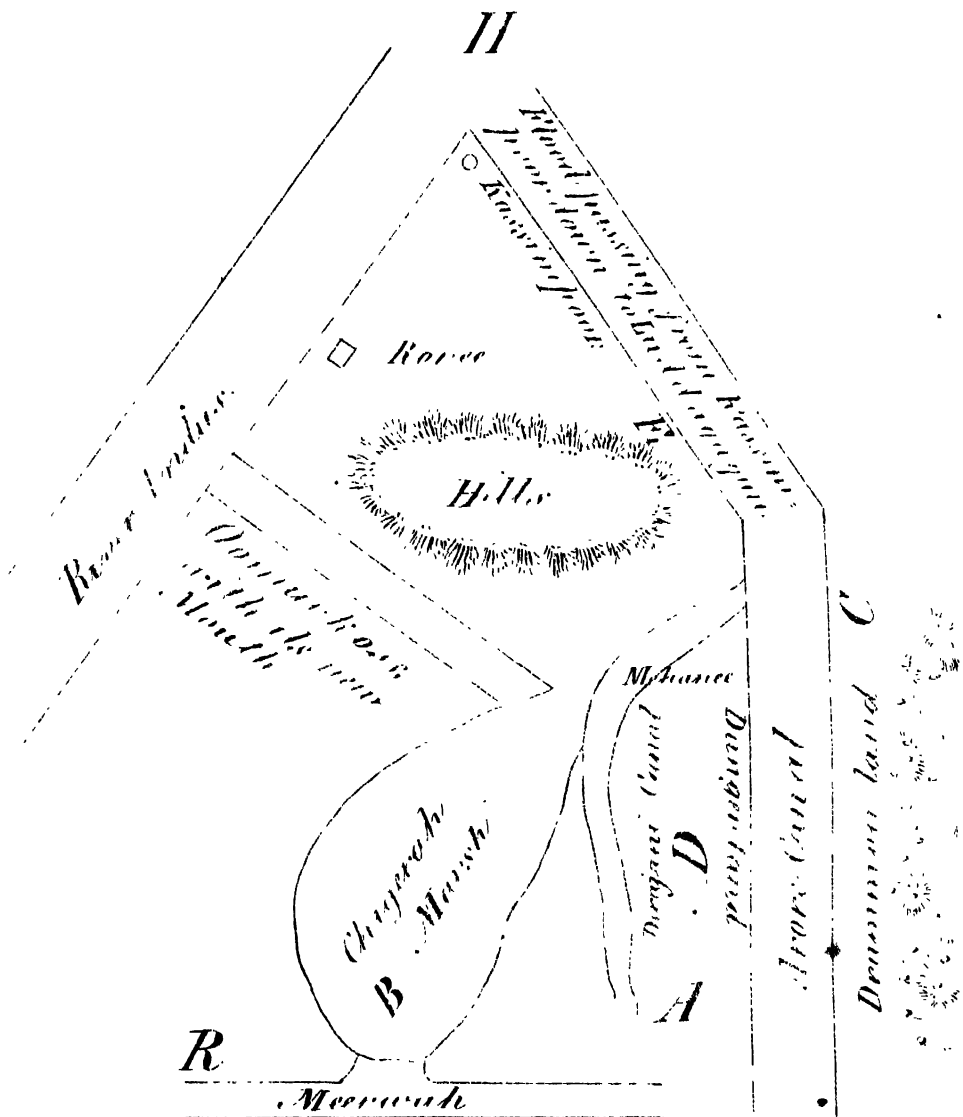
quence was, that the sub-divisions arrived at by me were more numerous. Neither the one nor the other pretend to any estimate of the shades of soil, proximity to market,* &c.

4. Now it is self-evident that sand is an element injurious to soil; and being so, it follows, that in appraising soils equitably, it must be taken into account. Nevertheless, I think it will be apparent to you from the annexed explanation, that *in practice* my method would, *very probably*, in numerous localities be felt by the cultivator as the less equitable at the present time. There, then, is the tract of country in which I am moving. You will observe that it is a square, bounded on the north and on the east by hills, on the west by the river, and on the south by Meer Ali Moorad's Meerwah. Within the square is a large and far-reaching depression of land, called the Chigerah Dund, and this dund is annually filled with water from the Meerwah, from the water of the Kassimpoor flood passing down through the hills, and so on into the Arore Wah, whose banks it overflows; and down the Derajani canal, a small volume of water reaches the dund from the Oomurkoss canal. The soil of the plain is drummon, especially toward the hills, interspersed with wooded spots of dungur; and turning westward into shorah, until you reach the river, where the broad belts of date trees again discover the dungur land.

5. Now if we figure the Luddagun Moonshee wending his way among miles of mouch grass, and frequent inundated spots in all directions, over this plain, in view to discovering the cultivated patches, and assess these by the jureeb, in conformity with the rates obtaining, it is easy to apprehend the state of perplexity he will be in when he shall arrive at the land marked D. He will observe that the land "drinks" (as he would express it) at the Arore Wah, and he observes that the cultivators are growing a rubbee crop, and that in some spots, where a little water is still lying in the canal, they have erected a wheel. He looks at his Rules, and finds that land flooded by water passing along a canal, and overflowing its glacis, is "Moke," and that when a wheel is also used, it is "Moke chirka"; and he knows, and believes the Collector to suppose, that khureef crops ought to be grown on moke and chirka. And yet there is the fact of a rubbee crop before him, and the cultivator is able to prove that the water comes by flood from Kassimpoor, passes through the hills, and inundates his estate. And if the people to the southward have cut the Arore canal for their own benefit, that is nothing to him. His land is, and always was, sylabee (inundated): *ergo*, where no wheel is discoverable, the crop is (bossee sylabee land) "Bossee," and when there is a wheel it is "Peawee on sylabee."

6. And if to the foregoing difficulty should be added those which would be involved under my sub-divisional arrangement, the Moonshee would further have to assess the land at D according to dungur rates, and the lands at C according to drummon rates. These latter rates I fixed arbitrarily high, in

* The demand on the khureef land in the vicinity of Shikarpoor is an exception to the rule.



view to deterring cultivation on a poor soil, while good lands were lying waste. But the Zemindar at C immediately meets you with the exclamation that *all* his land is drummon; that even now he can scarcely get any lapa (Zemindar's per-centage) from it.

7. Again, the following season, when the Moonshee shall arrive, he will find, perhaps, that owing to Mr. Fife's new cutting, all the flood water is bunded out, and that the lands at D and C are either lying waste, or are "drinking" at some new canal.

8. In practice, the Moonshee would doubtless cut the knot, by entering the *crop* in his mind: he would not concern himself with the land beyond, perhaps, measuring it, but he would think "This is jowaree"; and "They have got no wheel, I see." It is assessed accordingly, and appears as a tax on the land, irrespective of crop or season—or rather under my rates they would be so entered;—under yours they would show the season, whether khureef or rubbee, because your rates are published per jureeb per harvest, and not per annum.

9. On the whole, then, I submit, that the introduction of my rates, or any modification of the same principle, would, *in practice, under present circumstances*, and in probability, only create fresh difficulties, without securing any corresponding good. In allowing the cultivators of the Resumed Districts the option of selecting my higher rates, with remissions, you give them a choice, without making any demand; you endeavoured to dispose of the question whether those cultivators really do prefer the nearest money equivalent to a buttai system; and you accomplished all that my Report suggested, for the present time. It was, indeed, written chiefly in view to removing from the way of any Revenue Survey Officer coming into these districts, the elementary difficulties which had occupied much of my own time; but which, when once explained, are obviated.

10. I would deferentially add, that even had my suggestions been far worthier than they were, they would not have merited being published. I think any Ishtaharnama relative to assessment should, especially when it involves any new element of discussion, be issued with the greatest caution. An assessment notice is a shock to the agricultural districts: it is felt in every landee; and is among the very few matters that can disturb a cultivator's mind. If, then, these notices be frequently promulgated, they tend to unsettle a population, whose habits are already too nomadic. Moreover, I think we cannot approximate the most desirable end of an equitable tax on the land by taking a Purgunna or a Deputy Collectorate in the mass, sub-dividing or classifying its soils, and then directing our Kardars to collect the revenue accordingly. Neither the land nor the agency is capable of this arrangement. To assess a beega fairly, it must first be defined, measured, and appraised, according to all its intrinsic and extrinsic disadvantages and advantages. The argument for a beega is applicable to a million of beegas.

11. I trust that the foregoing paragraphs will be considered to contain a satisfactory explanation of my former Report; and a summary of reasons suffi-

cient in force to excuse my not submitting the Rules required by the Commissioner. Certain ideas I have, indeed, drawn up in the form of Rules, but they are so general, and the cultivator's capacity for understanding is so limited, that on re-perusing them, I cannot anticipate they would prove of any practical use. And this notice of the cultivator's condition induces me to solicit permission to offer a few remarks upon that paragraph of the Commissioner's letter now noted (No. 1034, of the 28th March 1854, paragraph 4), wherein he expressed himself to the effect that this class "has not improved under our rule to the extent which might have been expected."

12. In my former Report, I characterised the Zemindar in the Left Bank districts as comparable with a sieve, through which the agricultural wealth passes into the hands of his Hindoo man of business; and in my Revenue Report for 1853-54 (vide paragraphs on leases), I respectfully hazarded an opinion, that in the event of Government continuing to grant leases, the Hindoo should, equally with his Mussulman partner, be recognized and held responsible. If this were done, the Hindoo would doubtless induce the Zemindar to cultivate more carefully, and in every way to become more exact.

13. But in respect of the relative positions of the Zemindar and his Bunnia, viewed apart from the subject of leases, I question whether this be not a result and an indication, rather than a cause, of the Zemindar's very helpless, and comparatively wretched condition; and this supposition is to some extent borne out by the fact that the Hindoo himself is usually very poor, and that both he and his Zemindar declare him (the Bunnia) to be progressively becoming poorer. May not the truth then be, that both were always poor, because there were few sources of wealth; and that, since the introduction of our rule has depressed nearly every indigenous source of wealth save farming, they have become still poorer?

14. If it be really the case, as I assume, that both are poor, because there is so little to divide, it is clear that suddenly (by what means soever) emancipating the Zemindar from his Bunnia would only tend to cause the latter to call in his debts and migrate, and to throw the Zemindar upon (tuccavee) Government advances, with all their trains of fraud.

15. Under correction, then, I submit, that the condition of the cultivating class must be ameliorated by other means than those comprehended in the accomplishment of the most perfect revenue regulations. It is, I most respectfully urge, by inducing a change both in the Hindoo and Mussulman of Sind themselves, that we must commence improving their social state: in other words, we must create in them fresh wants, with their natural consequences of increased trade, agricultural wealth, and population. What is primarily wanted is a stimulus to exertion. This stimulus may act mentally or physically; by the induction of emulation, or by example; or in securing physical comforts;—but there must be a stimulus. At present they are in a primitively philosophic state: they have scarcely any wants; and the first want

far between extravagances, into which they are led by the strong propensity for ostentation, are not of a nature to be inductive of much trade.

16. If we investigate the causes that render one country full of prosperous life, and in another lead to a condition approaching to social paralysis, we discover that they mainly lie in the constitution and habits of the natives of those countries. It is the multitude of artificial requirements of Englishmen that has developed America and Australasia, and it was the falling off and final extinction of civilization in Carthage and Rome that changed the Northern Coast of Africa from an empire's granary into a few patches of nomadic husbandry, very similar to those prevailing in Meerpoor and Oobowra. No doubt good government will foster and develop artificial requirements; but good men will also, and in far greater degree, secure good government, good roads, and good markets. The growth of all is simultaneous. The age and country are always good enough for its men. But the original motive power lies in germinating or in communicating a general stimulus to exertion.

17. Any person who looks back through our own history, or that of any other old country, will immediately perceive how slowly these wants arise: they are not the creation of a day, nor of a generation—they must grow with the nation's growth; they cannot be grafted full-grown by a civilized man on a barbaric host. He may, indeed, form in barbaric cities small nuclei, which shall by degrees increase, until they embrace all the rural population; but he cannot do more. The few wants communicated will germ others, and the barbarian's grandson will become semi-civilized; and so on, until a period shall arrive like that of the nineteenth century in England. In this general progression agriculture will progress. It is a ray—an arc, so to write—of the circle of civilization, whose centre is man.

I have, &c.

(Signed) LEWIS PELLY, Lieutenant,
Deputy Collector, Left Bank of Indus.

(True copy)

J. GIBBS,
Assistant Commissioner.

[No. 9.]

No. 146 of 1855. .

REVENUE DEPARTMENT.

From the COMMISSIONER IN SIND,

To the COLLECTOR OF SHIKARPOOR.

Dated 15th January 1855.

SIR,

In reply to the concluding paragraph of your letter as per margin, I have the honour to inform you, that the principles laid down in the drafts of Notifications enclosed in your letter appear to me to be generally very greatly in advance of those heretofore recognized in Sind, and I have no doubt whatever, that the assessments which may be framed under those instructions will be a great relief to the cultivators, and tend much to the improvement of your charge.

No. 468, of the 18th December, regarding the Revision of the Assessment.

2. The exact extent to which they have been made public, and to which, therefore, they are binding on us, is not apparent. They are drawn up in the form of a Notification, and addressed as to the body of cultivators; but I understand from your letter, that they are rather to be regarded as drafts for the consideration and general guidance of your subordinates. The rates laid down in them are general rates, as if applicable to the whole Collectorate; but I understand you to agree with me that such general rates will require considerable modification to adapt them to the varying circumstances of different localities.

3. Any doubts on this subject are, however, of less moment. The Rules enclosed in my letter noted in the margin provide that a separate Report shall be submitted on the revision of assessment in each district, which will be laid before Government, before the rates fixed by the revising Officer are considered permanently sanctioned. I will therefore at present merely offer a few remarks on parts of the subject discussed in your Report which have not been separately noticed.

No. 34, of 4th instant, forwarding Memo. of Rules for Revision of Assessment.

4. As regards the cultivator's preference for buttai, I think I have already expressed my conviction, that setting apart the repugnance of ignorance, and in consequence timidity, to enter on any new system, I have not yet met any case of an intelligent cultivator ever preferring buttai to a moderate cash assessment.

On the Causes of the Cultivator preferring Buttai, and the extent to which he is subject to the Bunna, or Money-lender. Collector's paragraphs 3 to 6, of No. 402, of 20th October 1854.

5. That he prefers buttai to *our* cash assessment is often the case; but I think in such cases it will

always be found that the assessment, even when low in actual amount, is not a moderate one.

6. If from bad roads, want of carriage, fiscal restrictions, or any other cause, he is unable to sell his grain, when we demand our revenue, and has consequently, in order to procure the means of meeting our demand, to give his village Bunnia twice or three times as much grain as would cover the assessment if sold a month earlier or later, or in open market, at a town 20 miles off, it is clear, however low the amount of money we demand, it is *not a moderate cash assessment*.

7. The remedy in such cases is not merely to lower the assessment, but to give the cultivator access to markets by roads, and means of carriage, and by altering the time when we demand our revenue, so as to suit the natural time for his selling his grain to the best advantage.

8. Again, if we fix an inflexible assessment, and the cultivator's crop is subject to more than ordinary risk, from frost, flood, locust, or drought, it is clear, that however moderate our assessment may be in good years, it can hardly be so when the crop fails; and the cultivator will naturally prefer buttai, which shares the grain and loss with some sort of equity.

9. But if we tell him, as you have been authorised to do in such cases, that he shall have to pay no more than a moderate cash assessment in good years, with the right to claim buttai whenever he applies in good time, I doubt whether he will ever wish for buttai, as long as he can by any possibility pay his cash assessment.

10. Under such a system, I believe it will be found that the localities where the crop is really subject to great risk, which the cultivator has no power to control, are much fewer than we now suppose.

11. Where such risks do exist, the average value of the produce can be but small, and even what appears in a good year to be a moderate cash assessment may be very heavy when judged by the average produce of a series of years. In all such cases, it is not that the cultivator prefers buttai to a moderate cash assessment, but that the assessment is *not* really moderate.

12. With regard to the great influence of the Bunnias or money-dealers over the poorer classes of cultivators, I must confess, that while fully sharing the sympathy expressed for the cultivators, I sometimes fear that the indignation excited by the usurious practices of the Bunnia may blind us to the real root of the evil.

13. If the cultivator can only furnish labour with a very moderate amount of agricultural skill, I fear that here, as in other countries, whatever the name he may bear, he can expect nothing but the wages of a moderately skilled labourer. The interests of the capital employed in procuring stock and seed, and paying the Government assessment, will then go to the man who owns the capital, as surely as naturally, and, I may add, as justly, if he be an Indian Bunnia, as if he were an English banker. Where the cultivator brings to the partnership nothing but his labour, it is difficult, even if it be just, to attempt to secure for him more than the wages of his labour.

14. This is a much commoner case than might be supposed. Our usual course is to attempt in some way to limit the profits of the capitalist, or to place Government in the position of a competing money-lender. The general, if not the inevitable effect of this is, to deter competition among capitalists, and thereby to make the pauper cultivator more than ever bound to the money-lender from whom he has borrowed.

15. It is not an easy task to protect ignorance and poverty, accompanied, as they generally are, by improvidence, from the rapacity of a class which possesses almost all the little education and capital to be found in the country: our best chance of success is to remove all artificial obstacles to the accumulation of wealth, to render the possession of land certain, to avoid overtaxing its cultivation, and to free the labourer from all artificial restraint, and leave him at liberty to carry his labour to the best market. He has, in his power to labour, a property, which (especially in this thinly-peopled province) is an object of competition among capitalists, and which, if applied to the best advantage, might always keep him in circumstances far superior to those of the majority of cultivators. But I need not remind you how much we have yet to do of our legitimate share of this task, in ascertaining and defining rights to land, in introducing certain and moderate assessment, and in freeing the labourer from those bonds which place him more in the position of a serf of the soil than of a free agent.

This brings me to an expression of general concurrence in the concluding paragraphs of Lieutenant Pelly's last letter (No. 347, of the 25th November 1854), with reference to which, I must confess to some regret that the mass of valuable information and just remark, contained in his first Report, should be left rather as a contribution to our stock of knowledge than a direct prelude to any practical measure.

17. While, however, expressing my concurrence with Lieutenant Pelly in his remark that the permanent improvement of the people is not to be effected by mere revenue regulation, I would add, that I look for much improvement, in various indirect ways, from a sounder system of revenue administration than at present obtains.

18. By ascertaining, defining, and recording rights in the lands—by fixing a moderate cash assessment—we get rid of some of the main causes of the constant interference of Government Officers with the cultivators; which appears to me one of the great curses of the country, and a principal reason of the depressed condition of the people.

19. As a general rule in Sind (with of course numerous exceptions), instead of every man having his own fields defined and secured to him, and knowing what he has to pay, when, and to whom—all has been uncertainty and interference throughout the season, from the time the Government officials commence urging the cultivator not to leave his land untilled, till the produce is finally divided, and his share handed over to him. The natural consequence is, that such interference has become so much a habit, that the interference of

Government officials can hardly be dispensed with in the most ordinary operations.

20. By lessening the necessity for such constant and minute interference in one of the principal occupations of the population, sound revenue regulations will, I believe, effect more towards civilizing and improving the people, than almost any other single measure within the power of Government to carry out.

I have the honour, &c.

(Signed) H. B. E. FRERE,
Commissioner in Sind.

Commissioner's Office, Camp Khyrpoor, 15th January 1855.

(True copy)

J. GIBBS,
Assistant Commissioner.

LARKHANA DEPUTY COLLECTORATE.

- No. 1.—Statement showing the Boundaries of Dehs; Rough Measurement of Village Lands; Annual Extent of Cultivation by principal Zemin-dars; Average Number of Wheels, Wells, &c.; with the Amount of Revenue annually realized to Government, &c. in the Tuppadaree of ———.
- No. 2.—Statement showing the Extent of Cultivation; Number of Chirkas and Hoorlas; and the Average Cash Produce from each kind of Land per Beega; with the Average Number of Beegas cultivated on Chirkas and Hoorlas, and the whole Produce therefrom in Grain, with estimated Equivalent in Cash, as produced in the different Dehs in the Tuppa-daree of ———, on the Average of the last Four Years, from Fusi 1261 to 1264.
- No. 3.—Statement showing a few of the principal Canals in each Tuppa-daree, with the Annual Canal Clearance Expenses of every kind; with the estimated Expenses of Cultivation per Beega, on every Class of Land.
- No. 4.—Statement showing at what Rates per Beega the different descriptions of Land should be assessed in each Tuppadaree; as also any Emoluments, such as Mamool, &c. realized under the past or present Rule, by any Zemindar.
- No. 5.—Statement showing what Cash-Rates are proposed to be levied on Lands that have been for years past uncultivated, or never cultivated, and now covered with Jungle; together with those adjoining Wells ("Ghairabad").

[illegible]

(Signed) ST. CLAIR FORD, Lieutenant,
Deputy Collector, Larkhana.

No.

Statement showing what Cash-Rates are proposed to be levied on Lands that have been with those adjoining

Number.	Tuppadaree.	Doh.	Rough Measurements of Lands uncultivated (Jungle), with particulars.				How any or the whole of these Lands can be brought under Cultivation ; whether by digging fresh Canals, or how ? And if so, from whence and to where, with any other suggestion that may occur.	What Rates to be levied per Beega, on the Lands that can be brought under Cultivation, and for how long.	Whether any of the Land-holders will agree to bring any of these Lands under Cultivation, at the Rates shown in Column 131 ; and if so, to what extent ; and whether they are willing to bind themselves to pay " Nakashta " for any of their Old Lands they may leave uncultivated.
			No. of Beegas uncultivated, and covered with Jungle, as shown in Column 12, Statement No. 1.	No. of Years since under Cultivation.	Dense Jungle, or how.	Land high or low.			
123	124	125	126	127	128	129	130	131	132

Larkhana, Deputy Collector's Office.

5.

for years past Uncultivated, or never Cultivated, and now covered with Jungle ; together Wells (" Ghairabad").

Under those restrictions, the estimated No. of Beegas that may be expected to be brought under Cultivation of those shown in Column 126.	Estimated Amount of Expense per Beega to be incurred, with Produce to be derived from the Lands shown in Column 133.	No. of Wells (Ghairabad), as shown in Columns 24 and 25 of Statement No. 1.		No. of Years Ghairabad, and Causes ; what assistance is required to bring under Cultivation these Well Lands ; and are the Owners willing so to do ?	REMARKS.
		Wells.			
		Pukka.	Kutch.		
133	134	135	136	137	138

(Signed) ST. CLAIR FORD, Lieutenant,
Deputy Collector.

[No. 10, with Enclosure.]

No. 467 OF 1854.

REVENUE DEPARTMENT.

From the COLLECTOR OF UPPER SIND,

To the COMMISSIONER IN SIND.

Dated 15th December 1854.

SIR,

With reference to my Report No. 402, and its accompaniments, from Lieutenant Pelly, regarding the new Revenue Settlement of this Collectorate, I have now the honour to forward Reports by Lieutenant Wallace and Lieutenant Ford on the same subject, in reference to their respective districts.

2. The Statements accompanying these Reports afford valuable data for fixing the land-rent according to classification of soils. It was my wish that the expense of all canal clearances defrayed by villages, in the several Talookas, should be added to the general expense of cultivation. This, I perceive, Lieutenant Wallace has omitted, and the results shown in his statement of cost appear overrated.

3. The form which is under preparation by Lieutenant Ford is elaborate, and will include all information necessary to the elucidation of the general question of assessment of all villages in his charge. As this is still unfinished, the blank form of statement is submitted.

4. These documents, I trust, will meet with your approval.

5. In Lieutenant Ford's 19th paragraph, he recommends rent-free grants for a year or two, in cases of bringing under cultivation lands long waste. I am averse, however, to such, excepting in garden-making, or wells, in which there is no corresponding return for a number of years. It does not appear to have been the practice in the Chandooka districts, where the population is of a more fixed and unchanging character than in other parts of the country, to grant puttas of partial remission for irrigationary works made to bring lands long neglected into use. It is impossible to do this in any extensive measure, without its operating prejudicially to old cultivated lands; and to prevent such a result requires more than ordinary care and management. But having this season visited the back-lying lands of the Chandooka districts, I have directed that some of the small watercourses, which have not been used for the last thirty years, be cleared, and their waste lands be re-cultivated, on sufficiently remunerative terms to admit of the necessary labour being expended on

them. It is in such cases that small advances as tuccavee may be advantageously made, regarding which I addressed you on the 11th instant.

I have, &c.

(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

Larkhana, Collector's Office, 15th December 1854.

(True copy)

J. GIBBS,
Assistant Commissioner.

No. 339 of 1854.

REVENUE DEPARTMENT.

From the DEPUTY COLLECTOR OF SHIKARPOOR DISTRICT,
To the COLLECTOR OF UPPER SIND.

Camp Gurhee Bhodeel, 11th November 1854.

SIR,

In pursuance with instructions conveyed in your Memo. No. 1034, dated 1st June 1854, I have the honour to forward my views relating to the new rates of assessment, and to various other measures mentioned in your Report to the Commissioner in Sind, No. 33 of 1854, regarding the revenue administration of the Upper Sind Collectorate.

2. My inexperience in all matters connected with a subject requiring so thorough a knowledge of all its details as does this, will, I trust, plead as an excuse for my touching but slightly on the different points on which my opinion is required.

3. The old rates of assessment pressed hardly on the cultivator, both from their leaving him but small gains were his crop an average one, and from the fact that by one of their provisions there was no compensation granted for any failure of crop, unless caused by submersion; and as this year only 662 beegas of cultivated land were destroyed from this cause, 657 beegas of which were brought under cultivation for the ensuing rubbee, it will be seen that but little was done in the way of help to the cultivator, against the numerous causes of loss to which his crops are liable.

4. The new rates of assessment introduced by you since Rubbee 1265 are most favourable to the ensuring a liberal return to the cultivator in case of a favourable harvest; but I would venture to suggest, that living, as the Zemin-dars in my districts with very few exceptions do, from hand to mouth, the

disbursement every fust of hard coin for their cultivation, whether it makes them a good return or not, would be a matter of great difficulty, and would materially tend to keep them in the hands of the Bunnias; and so long as such is the case, cultivation will increase but slowly. A liberal system of remission, with rewards bestowed, in the shape of free grants of a beega or two for any creditable exertion on the part of a Zemindar, to increase his cultivation, and a loongee bestowed at the hands of the Collector, or of the Commissioner, in cases where such distinction may appear to have been merited, would greatly stimulate, not only the fortunate gainers of such rewards, but the community at large, to bear patiently a temporary loss, and to endeavour to make it up by increased exertions. The old system of buttai, now, much to the real gain of the cultivator, abolished, rendered any such exertion unnecessary, because it did not occasion any additional demand on his resources, whatever the crop might be, beyond the Government share. This system, so congenial to the lazy and apathetic Mussulman, by rendering him indifferent to the result, induced a careless style of cultivation, and was a complete bar to his advancement. This system, but lately changed for the present one, unfitted the Zemindar for any struggle with circumstances: in the event of his crop failing, he becomes disheartened, and being obliged to obtain the wherewithal to pay his assessment from the money-lender, finds that next seed-time he is unable to increase his cultivation; on the contrary, in many cases he will be obliged to decrease it. This course will only involve him still more, and two or three consecutive bad seasons would render him entirely dependent on the caprice of the Bunnia for means wherewith to cultivate. Under these circumstances, as the cultivator appears hardly able to walk alone in the new path marked out for him, I cannot help thinking, that by Government watching and aiding his steps until he shall be fairly set going, the condition of this class will be greatly improved; and until they are, in a measure, independent, they will be unable to improve their land, or to till it in a more effectual manner than is the case at present. All admonition is lost on them, so long as their hands are tied by their difficulties; but when these are removed, then the great increase of cultivation will amply repay Government for the reduction of assessment.

5. The complete state of ignorance in which the agricultural population of my district is plunged, as regards education, by rendering them liable to be plundered largely by the Bunnia, is a drawback to their welfare; and it will be a work of time to obviate this, as the sons of very few Zemindars know how to read and write, and the parents are unwilling to withdraw them from labour in the fields, to acquire knowledge that would save them five times the amount expended in paying a substitute.

6. As at present it would be hardly worth while to erect houses at any save two or three, the large villages in my district, I intend distributing the Sindee books now in use among such village teachers as I may find; and would respectfully suggest, that a promise of rewards be held out to those who shall be found, on your visiting the districts, to have shown themselves most active in

teaching the vernacular—this being, I think, the most desirable description of knowledge to be generally diffused as a beginning.

7. I have endeavoured to obtain a statement of the expense attendant on the cultivation of a beega of land, from the period of preparing the land for the reception of the seed, down to the winnowing of the grain after the harvest; as also of the return to be expected from a beega of land, supposing the crop to have turned out well. I fear that the present return is but an approximation to the truth; but in the absence of any sure grounds to calculate upon, it will, perhaps, serve as a guide. The rates of assessment I consider as likely to give the cultivator a fair return I have also noted, in a second statement. The value of the produce of a beega of land, as shown in the first statement, is calculated from rather high rates, as shown in the accompanying price current. The prices of grain here quoted could hardly remain so high for any length of time.

8. The classing of the soil in each deh is being carried out agreeably with the instructions on that head contained in your endorsement No. 525 of 1854, dated 1st June. I am ascertaining the extent of each deh, and the nature of the land therein, as I go on. When I shall have completed this, I will inform you of the result; also furnishing the names of such Zemindars as are willing to take leases of the land about their villages or dehs. The Kardars have received orders to record the area of land in their Talookas sub-divided into dehs, with the quantity of land of each class therein contained.

9. In classing the khureef land, I would propose taking into consideration the quality of the soil, and the facilities of irrigating it; but with regard to the rubbee land, as the uncertainty of the course which the inundation may take will render a classification equally variable, I would propose that all rubbee land be classed in the first instance at the intrinsic value of the soil, and every year this be modified according to circumstances; it retaining its original valuation if fairly covered and saturated with water, and if only partially so, a corresponding diminution in its value to be made. Well land is seldom otherwise than first class, a Zemindar being naturally unwilling to lay out a large sum of money in sinking a well on any but good land.

10. Perhaps, in the classification of the khureef land, it would be as well to consider the varieties in the soil only, as the varying capabilities of the bullocks in different parts of the Talooka would be met by the different amount of land fixed as bilmooktee on each chirka and hoorla; with this exception, that the cultivators at the mouth of a canal are on an equality with those at the tail only so far as concerns the irrigation by wheel; but with the moke there is a great difference—a fall of an inch or two affects the moke at the mouths, whilst, at the tails of canals, so long as the water runs, the moke is available. Therefore, I would propose that land at the tails of canals be classed higher than land of a corresponding quality at the mouths.

11. I think it will not be feasible to have the lands in each deh throughout my district classed separately after this fashion before the ensuing peshrus; but

should you think it advisable for any such arrangements to be carried out, their completion would not be delayed further than June next.

12. By conferring sunnuds on the most intelligent Zemindars, giving them power to try cases of abuse, or of slight assault, and of apprehending persons suspected of any crime, a great check on all bad characters would be obtained; and besides, great trouble and inconvenience to witnesses would be removed. Zemindar Sultan Alee Shah of Sukkur, Wuhid Bux of Jaghun, and Allahindo Dhull of Amrote, are men of generally recognized integrity, and are, I think, qualified to exercise such powers as a beginning: should Puttadars be included, the Puttadar of Gurhee Yaseen, Abdoolah Khan Barukzaye, is a man of considerable possessions, and standing; but as you are perfectly well acquainted with all the principal Zemindars, it is superfluous for me to mention any in particular.

13. The granting rewards, and holding out inducement to the Zemindars, with a view to stimulating them to increase and improve their cultivation, is a measure that would prove most efficient in obtaining the desired end. Any fixed rule could not be easily laid down; but any case deemed worthy of your notice could be reported by the Deputy Collector. Small prizes might be given for the largest amount of cultivation of indigo and linseed in each Talooka, whilst one or more larger prizes might be competed for by the whole district, for the encouragement of growers of American cotton. As the cultivation of this plant has been hitherto attended with unfavourable and discouraging results, a small free grant of land might be offered for competition, to be awarded to the individual who could produce the largest quantity of cotton, and the best cleaned of his own growing.

I have, &c.

(Signed) R. R. WALLACE, Lieutenant,
Deputy Collector.

*Deputy Collector's Catcherry,
Camp Gurhee Yaseen, 11th November 1854.*

(True copy)

(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

Statement of Cost of Cultivating one Beega with various Crops, and for the different Fusls, in the Shikarpoor and Sukkur District.

Name of Kardarate.	Fusl.	Designation of Cultivation.	Cost on Cultivating One Beega.				Including Hukab, Total Cost per Beega.	Value of Produce of One Beega of common Grain.	Net Profit, without deducting Government Assessment.	Remarks.
			Well Land.	Sylabee or Moke.	Chirkas or Water Wheels.					
1	2	3	4	5	6	7	8	9	10	
Shikarpoor	PESHURUS.	Cotton	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.		
		Indigo	.....	3 5 0	.....	3 10 0	8 12 0	5 2 0		
		Sugar-cane	39 10 0	7 10 0	.....	.....	16 8 0	8 14 0		Understated.
		Cotton	.....	.....	.....	39 14 0	75 0 0	35 2 0		
		Ditto	.....	2 10 0	.....	2 12 0	5 0 0	2 4 0		
Abdoo	PESHURUS.	Ditto	.....	.....	4 11 0	4 15 0	8 12 0	6 12 0		Overstated.
		Sugar-cane	33 11 0	.....	.....	33 15 0	17 8 0	12 9 0		
		Cotton	.....	.....	1 14 0	2 4 0	75 0 0	41 1 0		
		Ditto	.....	0 4 0	.....	0 10 0	4 8 0	2 4 0		
Nowshera	PESHURUS.	Sugar-cane	14 8 0	.....	.....	.....	3 0 0	2 6 0		
		Cotton	5 6 0	.....	5 6 0	5 10 0	50 0 0	35 8 0		Overstated.
		Ditto	.....	1 14 0	.....	.....	21 0 0	15 6 0		
Sukkur			.....	.....	.....	.....	4 8 0	2 8 0		
Shikarpoor	KHURREEF.	Jowaree	.....	.....	4 2 0	4 7 0	10 3 0	5 12 0		
		Ditto	.....	2 6 0	.....	2 11 0	4 12 0	2 1 0		Overstated.
		Jowaree	.....	.....	3 5 0	3 9 0	10 3 0	7 6 0		Ditto.
		Ditto	.....	2 9 0	.....	2 13 0	8 14 0	6 1 0		Expenses understated.
		Carrots	2 0 0	.....	.....	1 3 0	10 0 0	8 0 0		Overstated.
Nowshera	KHURREEF.	Jowaree & Bajree	.....	.....	0 13 0	1 3 0	7 0 0	5 13 0		
		Ditto	.....	0 13 0	.....	1 3 9	6 0 0	4 13 0		

Name of Kardarate.	Fusl.	Designation of Cultivation.	Cost on Cultivating One Beega.			Including Hukab, Total Cost per Beega.	Value of Produce of One Beega of common Grain.	Net Profit, without deducting Government Assessment.	Remarks.
			Well Land.	Sylabee or Moke.	Chirkas or Water Wheels.				
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
Sukkur.....	KHUREEF.	Jowaree .....	....	2 2 0	4 6 0	4 14 0	10 0 0	5 6 0	
		Ditto .....	....	....	....	....	6 12 0	4 10 0	
Shikarpoor	RUBBEE.	Wheat	4 14 0	....	....	....	15 0 0	10 2 0	Rather overstated
		Vegetables, &c..	9 12 0	....	....	....	18 8 0	8 12 0	
		Tobacco	11 0 0	....	....	....	32 8 0	21 8 0	Overstated.
		Onions	10 2 0	5 6 0	....	....	21 9 0	11 7 0	Rather overstated
		Wheat .....	....	....	....	....	12 0 0	6 10 0	Ditto ditto.
		Wheat	5 1 0	....	....	....	15 8 0	10 7 0	Ditto ditto.
		Ditto .....	....	....	....	....	12 1 0	6 12 0	
		Tobacco	10 3 0	5 5 0	....	....	31 8 0	21 5 0	Overstated.
		Onions	9 11 0	....	....	....	19 11 0	10 0 0	Rather overstated
		Wheat, Tobacco, and Onions ..	3 5 0	....	....	....	10 8 0	7 3 0	
		Wheat .....	....	2 8 0	....	....	10 0 0	7 8 0	
		Wheat	5 13 0	....	....	....	12 0 0	6 3 0	
Sukkur.....		Ditto .....	....	3 2 0	....	....	7 8 0	4 6 0	
		Ditto .....	....	....	5 13 0	....	12 0 0	6 3 0	

(Signed) R. R. WALLACE, Lieutenant,
Deputy Collector.

(True copy)
(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

Table of Prices on which the Return to the Cultivation of One Bega of Land sown with these Grains, &c. is calculated, from Two Years' Average, i. e. 1852-53 and 1853-54.

Crops.	Shikarpoor.	Abdoo.	Nowshera.	Sukkur.
	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Cotton, cleaned.. .. per maund	11 0 0	10 0 0	10 5 0	10 10 0
Wheat, 1st sort.. .. "	1 7 6	1 5 6	1 4 10½	1 6 6
Ditto, 2nd sort.. .. "	1 5 6	1 3 0	1 4 0	1 4 0
Jowaree, 1st sort "	1 0 6	1 3 0	0 15 7	1 1 9½
Ditto, 2nd sort "	0 14 0	0 15 0	0 13 9	1 0 0
Bajree, 1st sort.. .. "	1 0 6	0 15 0	0 6 0	1 9 0
Ditto, 2nd sort.. .. "	None.	0 14 0	None.	None.
Jhow, 1st sort "	0 15 6	1 0 6	0 6 0	0 12 8½
Ditto, 2nd sort "	0 14 6	0 15 0	None.	None.
Shalee, 1st sort.. .. "	1 7 6	0 8 0	None.	1 9 0
Ditto, 2nd sort.. .. "	1 4 0	0 7 6	None.	1 3 0
Rice, 1st sort "	3 0 0	2 4 0	2 1 0	2 14 0
Ditto, 2nd sort.. .. "	2 8 0	2 1 0	1 14 6	2 8 0
Rice, red, 1st sort "	2 2 6	2 5 0	None.	2 4 0
Ditto, 2nd sort "	1 1½ 0	1 9 0	None.	2 0 0
Gram, 1st sort "	1 12 0	1 8 0	0 15 0	1 9 1½
Ditto, 2nd sort.. .. "	1 7 0	1 5 0	None.	1 5 0
Jambha, 1st sort "	1 9 6	1 7 0	1 1 0	1 6 0
Ditto, 2nd sort.. .. "	1 2 0	1 5 0	1 0 0	None.
Muttur, 1st sort.. .. "	0 11 6	0 11 0	None.	0 8 0
Ditto, 2nd sort "	0 10 0	0 10 0	None.	None.
Moong, 1st sort.. .. "	1 8 0	1 12 0	None.	1 11 6
Ditto, 2nd sort.. .. "	1 7 0	1 2 0	None.	1 9 6
Indigo, 1st sort.. .. "	65 0 0	52 8 0	None.	30 0 0
Ditto, 2nd sort.. .. "	60 0 0	46 0 0	None.	25 0 0
Sugar-cane, 1st sort "	3 12 0	3 2 6	3 6 7	2 0 0
Ditto, 2nd sort "	3 8 6	3 2 0	3 3 6	1 13 0
Till, 1st sort "	2 4 0	None.	1 2 0	1 4 0
Ditto, 2nd sort.. .. "	2 0 0	None.	1 0 0	1 2 0

(Signed) R. R. WALLACE, Lieutenant,
Deputy Collector.

(True copy)

(Signed) T. R. STEUART, Major,
Collector, Upper Sind.

Proposed Rates of Assessment for each Fusi in the Shikarpoor and Sukkur District.

SHIKARPOOR.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Talookas Fusi.	WELL LAND.	ON CANALS.								SYLAHEE and MOKE.		REMARKS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
PESHKURV.	KHURRUF.	KHURRUF.	Chirkas.				Hoorlas.				Rs. a.p. Rs. a.p. Rs. a.p. Rs. a.p. 1 2 0 1 0 0 0 14 0 0 12 0																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			Class.				Class.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
			1st.	2nd.	3rd.	4th.	1st.	2nd.	3rd.	4th.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
			Rs. a.p. 1 4 0	Rs. a.p. 1 0 0	Rs. a.p. 14 0 0	Rs. a.p. 12 0 0	Rs. 39 for 35 bgs. ; excess.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

No. 417 OF 1854.

REVENUE DEPARTMENT.

From Lieutenant St. CLAIR FORD, Deputy Collector of Larkhana,
To Major T. R. STEUART, Collector in Upper Sind.

Dated 9th December 1854.

SIR,

With reference to your endorsement No. 525 of 1854, in Revenue Department, dated 1st June 1854, forwarding correspondence on the subject of land assessment, I have the honour to report that I at once commenced making the necessary inquiries.

2. After a careful perusal of the Commissioner's letter, and your Report, No. 33 of 1854, I framed a set of Statements, that would embody the pith of what appeared to me the wishes of yourself and the Commissioner in Sind, and having had the same carefully translated, forwarded them, with instructions, to my Native officials, directing them to prepare similar ones as quickly, consistent with accuracy, as circumstances would admit.

3. I have since, and am still prosecuting such inquiries as seem to me to bear most prominently on the points spoken of by the Commissioner; and it was my intention, after having proved the correctness or otherwise of several dehs in each Talooka, according to the Statements, to have transmitted to you copies in English of a Tuppadaree in each Talooka, and the rest in Persian; but as it has occurred to me, that not having replied to your endorsement may be taken as a sign that I have been inattentive to your orders, I now beg to forward blank copies of the Statements alluded to in paragraph 2, which I trust shortly to have compiled, and to offer a few remarks on the important subject to which they purpose to relate.

4. It may appear that the Statements are somewhat lengthy; but I found it was necessary to make them so, to compress under one view the whole of the matter required by the Commissioner in Sind, more particularly as set forth in paragraph 14 of the Commissioner's letter.

5. Once completed, they must prove the immense information they will afford, guide one in framing village leases, and tend greatly to facilitate the assessing of lands.

6. I have been particular, during constant intercourse with Zemindars and others, to impress on their minds the importance of arriving at some near knowledge of the area of dehs, &c. and I trust columns 10 to 14 of Statement No. 1 will give a fair approximate.

7. The Talookas have been divided properly into dehs, whose boundaries are well known, and defined, and which will be entered in columns 6 to 9 of Statement No. 1.

8. In compliance with your orders regarding plotting out village lands, and then entering them in a field-book, to prevent the necessity of a constant yearly remeasuring, and to facilitate the granting of remission on unproductive crops, I have, since the commencement of the year, been over several village lands, in company with the Zemindars, &c.; and from what I can glean, they would be glad to have some measurement of the sort under reference made, to relieve them of the trouble attendant on repeated measuring; and they seemed to think a deh or two might first be marked out as a sort of pattern.

9. To carry out the plan, I have the last few days called three or four Tuppadars before me, and after making them sketch out on paper one of the dehs in their charge, and explaining the nature of the required survey, sent them away to measure the lands, set up field sub-divisions, &c., and then again draw the same on paper.

10. I trust shortly you will personally inspect a deh thus mapped out.

11. We shall, I think, have no difficulty in carrying out these plans in our rice-growing dehs, though in others it may at first be difficult: however, a few trials will soon test the matter.

12. It has been explained that settlements are to be made for three seasons, peshrus, khureef, and rubbee, consequent on one water.

13. I should wish to have given an opinion, as desired, regarding rates that ought in future to be levied; but there are so many things to be considered when determining them according to the classification of the soil, that I hesitate to do so till I have collected such full information as would give me some foundation on which to rest the said opinion; though I think the rates ordered for last khureef with your circular letter No. 475 of 1854, dated 13th May 1854, very fair.

14. I am inclined to believe that the lands of some dehs in the Kumber and Nusseerabad Talookas are, perhaps, by the same too lightly assessed, and I trust shortly to have the statements for the dehs alluded to ready.

15. The granting of "Mamool," as set forth in your Notification, will, I am sure, be attended with many beneficial results; and the distribution of "Loongees" for new canals dug, or for any extensive clearing of old channels, should, I think, be annually made.

16. Regarding remission, I am inclined to think, that till we have some rough survey of the dehs, the same will be attended with difficulties; still I am of opinion it should be granted in the event of half or more of a crop being destroyed, as ordered for the past khureef—paragraph 8 of your Notification.

17. Respecting granting limited judicial powers to Zemindars, I would advise its being tried for a time. The Zemindar thus empowered might try all cases of petty theft to the amount of one rupee within his zemindaree, as

also minor cases of assault and abuse. He should be able to fine up to 8 annas, with power to sentence to four days' imprisonment in default. He should be burdened with no forms and returns of any sort: but on the parties concerned being called before him, he should then and there dispose of the case, by hearing what each person has to say; and if he considered the charge proven, and awarded a fine which was at once paid, he should merely forward the same to the nearest Tuppadar or Kardar, with a "Poorsah," simply stating from whom and why he had levied it, letting the offender, witnesses, &c. go to their homes. If he deemed the person charged innocent, he should discharge all, sending a memorandum, showing the offender's name, and charge, to the nearest Tuppadar or Kardar. In the event of the fine not being at once paid, he should forward the offender to the nearest Kardar, for imprisonment in his lock-up, with a poorsah, stating the punishment awarded. The Zemindars should have no powers of confining any one at their own "Utak" or village, for however short a period.

18. I think some such powers, given to the more intelligent and educated Zemindars, would answer, and prevent a number of persons (as must now often happen) being called away from their daily occupations, to give evidence or prosecute, at a distance from their homes, in many trivial cases that might have been easily settled by their Vuddarah.

19. If you approve, I might send a list of such Zemindars as I deem fit for the exercise of such powers.

20. It is very desirable to induce the Zemindars, &c. to extend their cultivation, and bring under culture waste lands; and as the same is always attended with more or less outlay of capital in the first instance, I would suggest, that in the event of any one agreeing to cultivate such lands, without deserting old ones, "Puttahs" being given, granting the same at low rates for the first two or three years. Of course we can lay down no general rule, as in every individual case circumstances would vary, some waste lands being covered with dense jungle, others being tolerably clear,—some being easily irrigated, others just the contrary; but it has occurred to me, that perhaps sufficient encouragement is not given to extend cultivation on lands which have long lain waste, or which, perhaps, never have been brought under the plough. Some instances might occur when a year or two free-rent might be given; but an assurance of the sort held out to the cultivators would be well, and aid in extending *cultivation.

21. It should of course be a *sine quâ non*, that all should be made to pay "Nakashta," if they were found relinquishing old lands.

22. To aid in the above, Government might always be ready to grant "Tuccavee" on good security, and fixed instalments for repayment.

23. The more I see how the agricultural system works in this province, the more I feel sure that the lower classes will not be materially benefitted, till they become aware that advances in money are to be had for cultivation or its aids.

24. These advances, given on good security, would be readily recovered ; and they might be repaid in one, two, or more seasons, according to the amount advanced, means of the receiver, or magnitude of the work, &c.

25. We must for a time at least step in and take the place of the "Sind Extortioner," or Hindoo money-lender; and till we do so, we shall not much improve the individual condition of the poor ryot.

26. The more liberal become our views on these matters, the more enlightened will the population become ; and they will by little and little be led to see that in our revenue and other arrangements we seek, not to aggrandise ourselves, but to pave the way to their own advancement.

I have, &c.

(Signed) ST. CLAIR FORD, Lieutenant,
Deputy Collector, Larkhana.

Deputy Collector's Office, Camp Ruttadhera, 9th December 1854.

(True copy)

J. GIBBS,
Assistant Commissioner.

[No. 11.]

No. 3 OF 1855.

REVENUE DEPARTMENT.

From the COMMISSIONER IN SIND,
To the COLLECTOR OF SHIKARPOOR.

Dated 1st January 1855.

SIR,

In acknowledging the receipt of your letter as per margin, I have the honour to inform you, that the Reports received therewith are highly creditable to Lieutenants Ford and Wallace, and will be forwarded, together with your previous communications, to Government, with a request that they may be printed among the Revenue Selections of Government.

No. 467, of 15th December 1854, forwarding Reports from Lieutenants Ford and Wallace, regarding the new Revenue Settlements in their respective Districts.

2. My best thanks are due to you for the attention you have devoted to this all-important subject, from which I anticipate excellent results in the reformation of the revenue system of your charge.

3. I have drawn up a Memorandum, which you will receive in a few days, relative to the general question of revenue settlements; and I will therefore defer more detailed remarks on the points which will be therein noticed at length.

4. With reference to Lieutenant Ford's proposition for temporary remissions of revenue, as an inducement to bring waste lands into cultivation, I would observe, that though there are often cases in which such a course may be advisable, and even necessary, yet, as a general rule, and in the present instance, I entirely concur in your remarks in paragraph 5 of your letter under reply, and approve of the course which you therein report having adopted.

5. The question of granting limited judicial powers to the principal Zemindars will be disposed of in the Judicial Department. In the mean time, Lieutenant Ford may be asked to send in a list of Zemindars to whom he would propose to grant the powers. (Vide his 18th paragraph.)

I have, &c.

(Signed) H. B. E. FRERE,
Commissioner in Sind.

Commissioner's Office, Camp Mittee, 1st January 1855.

(True copy)

J. GIBBS,
Assistant Commissioner.

[No. 12.]

REVENUE SETTLEMENT IN SIND.

1. The conditions affecting the settlement of a Government revenue, to be derived from the produce of the land, differ so much in Sind from those of most other parts of India, that no system as yet adopted in the latter would have any chance of success, unless considerably modified before its introduction into Sind.

2. The absence of rain, and the consequent dependence of cultivation on artificial irrigation, are the most obvious; but there are other differences in the constitution of villages, the division and tenure of property, and customs of the people, which must all be taken into account in deciding upon what so intensely affects the welfare, and even existence, of an agricultural population.

3. I will first endeavour to give a short sketch of the condition of Sind, with regard to supply of water, soil, land, tenure, village communities, &c.

4. Sind is, properly speaking, the name of the river, from the junction of the Attock (Upper Indus) with the Sittlej to the sea, and of that part of the valley watered by the river; and this is the only part of the province of much value, the rest consisting chiefly of sandy desert, and stony tracts, dependent for irrigation on the uncertain supplies of water afforded by the hill streams.

5. In the absence of a survey, we can hardly form a guess how much land is capable of being irrigated from the Indus. Opposite Larkhana, the breadth of the bed so watered to the west must be about 40 miles; while in the same direction below Schwan it is not more than four or five, till we reach the Delta, where it again expands. I have less knowledge still of the breadth of the bed on the left bank. In the northern districts it is very narrow, but lower down the large branches of the Indus extend it greatly.

6. The possibility of bringing water to any place in Sind depends upon the double, or rather treble slope of the surface—one parallel with, and the other two perpendicular to, the course of the river, which runs on its raised course nearly through the middle of the valley.

7. It results from this, that there is an available slope to carry water inland on either side, and that the slope can be increased by taking the supply from a situation higher up the river than the land to be watered. (Note I.)

8. There is, however, on either side, land too high to be reached (at least profitably), and this is the land already alluded to as dependent on the precarious floods from hill streams. A Section taken in a westerly direction from about Selah Naree, in the Mehur districts, would give an instructive example of the land in its different relations to irrigation. (See Diagram No. 1.)

9. To make this more intelligible, perhaps the accompanying diagram (Diagram No. 2) will be useful.

10. In Diagram No. 1, A shows the river in the cold season. From A to B is under water in the hot weather, but cultivated in the cold weather, when the river shrinks to its low level—this is the kutchha land. From B to C is land not naturally flooded by the river even at its greatest height, but which can be watered with Persian wheels. From C to D is a hollow filled with water in the hot weather, but which is cultivated as the bed dries up in the cold. From D, the ground rises to E, the bank of the Koodun canal. This portion is cultivated in the hot weather by means of Persian wheels, and affords dry ground for the cultivators' houses. From E to F the ground again falls, and between F and G there is another hollow. At G there is the Narra canal, and beyond it another slope and hollow, the Goza dund; but west of this the land is higher than the water of the river, and it slopes gradually upwards to the hills at K. As the bed of the river and the alluvial tract formed from its sediment rises with each annual deposit, the land capable of irrigation must go on increasing, and annually encroach on the slopes leading to the hills.

11. There are few places where the slopes are so regular as in the one I have taken as an example, or in which all these conditions are present; but some of them will be found in every village, and an assessment, to be successful, must adapt itself to all.

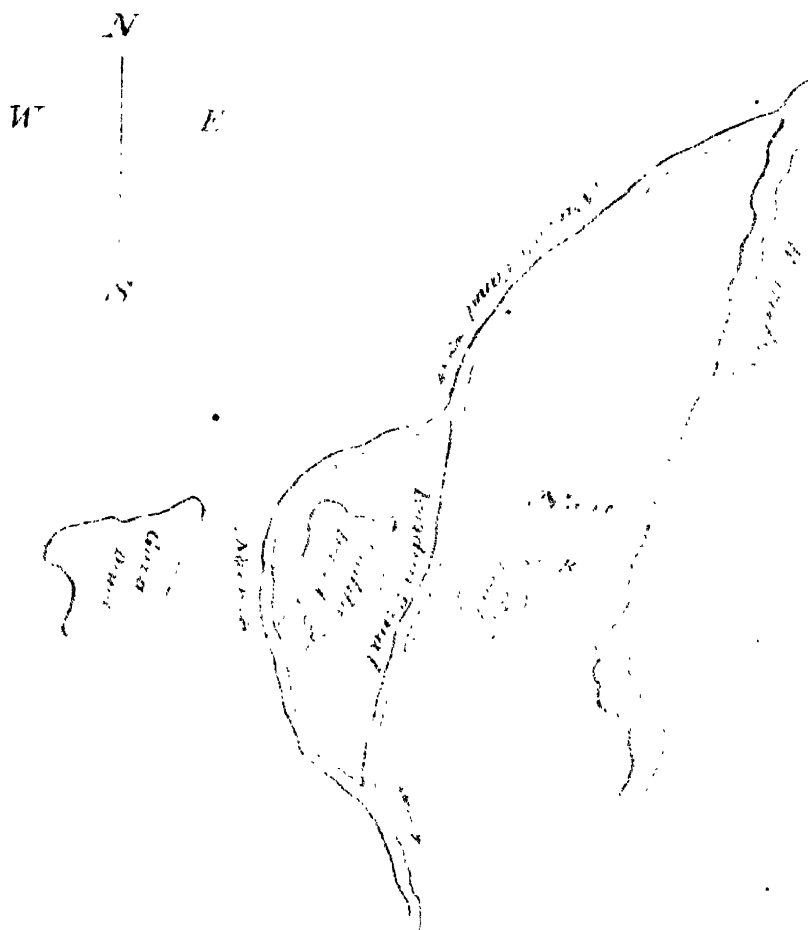
12. Were the course and rise of water of the Indus fixed and constant, the quantity and quality of the cultivation ought to vary little from year to year. But so far from this being the case, the channel is one year miles from where it was the one before, and both the height to which it rises, and the time at which the rise takes place, are constantly varying.

13. From the varying levels of the land of different villages, and the varying course and rise of the river, it follows not merely that each village has more or less and better or worse cultivation each year, but that in some years a village altogether lies waste, from want of or excess of water, as the case may be; and that the cultivation, in fact, shifts from one place to another. For instance, in a very low season, the water would not moisten the whole of the kutchha lands to B in Diagram No. 1, or the hollow between C and D. A certain moderate inundation would do this, and dry up in time to allow the whole bed of the hollows to be sown with cold weather crops; while an excessive rise of the river would so flood the hollows that they might remain under water all the year round; but the higher portions, especially that between J and K, would benefit in proportion,—the cultivation would shift to the high grounds; the low lands would lie waste.

14. This is not a hypothetical case of what might happen: I have seen it all take place in the situation of the Section given.

15. The lands dependent on the hill streams are sometimes called rain-lands, because the streams have water in them only after rain falls in the hills, which happens oftener than in the plains. The land is irrigated by throwing up high bunds round the fields, and diverting the water of the hill streams into them. The cultivation is even more uncertain than that watered by the Indus.

DIAGRAM No 2



Sometimes scarcely any rain falls during the year, and at others the water comes down with such force that it washes bunds and cultivation all away.

16. Land, or rather cultivation, has received several names, distinctive of the mode in which it is irrigated : the principal are—

Churkee.—When the water is raised from a canal, well, &c. by artificial means.

Moke.—When the watercourse is above the level of the soil, and the water runs on the surface, but under control.

Bossee and Sylabee.—When the land is so saturated with moisture, that it requires no further watering from seed-time to harvest.

Panceetee.—Sylabee, or land well moistened, but what can be irrigated from a wheel as well.

Sucht, or Simm.—Land of a porous nature, which sucks up sufficient moisture from an adjoining river or lake.

Bund Baranie.—The rain-lands described in the preceding paragraph.

17. The soil of Sind varies from a strong clay to the lightest sand, and is all more or less impregnated with salt. Large tracts have so much salt as to be quite barren. Some of

these bear marks of having been once cultivated, and are said to have become salt when the supply of water failed ; and the general opinion is, that all land, if not watered, becomes salt, and that the most saline can be made sweet by abundant irrigation. (Note II.)

18. The following are the principal varieties, and their names in the Schwan district ; and though the local names may differ, the soils will be found to correspond throughout Sind :—

A, *Chekee* and *Kurrura*.—These are both stiff clays : the first is on low inundated lands, and yields gram ; the other is in the bed of hollows, in which rice is grown.

B, *Waree* or *Varce*.—This is the sand thrown up by the river, or drifted by the wind, and, when pure, can yield no crop.

C, *Gussur*.—This is a rich loam, formed by the admixture, in the most favourable proportions, of Chekee and Varce.

D, *Vamasa*.—This is a loam, in which the sand predominates.

E, *Nor*.—A still more sandy soil than the above.

F, *Kullur*.—This is land so salt as to be barren ; the soil may be either of the above varieties.

19. The produce, and even the crop which shall be grown, is determined, not by the soil only, but by this, and the manner and time at which it can be watered. For instance,

Gussur is the best land for wheat ; but if it is only watered by a canal during the inundation, it must be cultivated with jowaree, or some other khureef crop.

20. The amount of produce varies so much with the soil, and supply of water, that it is difficult to draw an average. Of the khureef crops, a kurwar

(about 18 maunds of 80 lbs.) is sometimes obtained in Upper Sind from a beega (above half an acre, or, more exactly, 2,500 square yards), but a quarter of this is considered the average. Wheat is said sometimes to yield as much as a *kurwar*, which would be equal to about seven quarters an acre—a heavy crop in England. Two-thirds, however, is considered an excellent crop in Sind, and large tracts may be seen every cold season which cannot yield more than a *cassa* or two.

21. The market value of the common kinds of produce is very fluctuating, and there is a great want of an outlet for them, except in the immediate neighbourhood of large towns, where the home consumption is great. The price currents show a great and constant relative difference in the different villages, according to the facilities for disposing of produce.

22. Allowing for the rude agriculture, the neglect of rotation of crops, and of manure, the soil in Sind must be considered very productive; but owing to the inferiority of the crops grown, their money value is very low.

23. The mode of land tenure in Sind is very simple, well adapted to the exercise of individual enterprise, and the investment of capital in improvement; and it is very desirable that the revenue system should conform to it. It is, in fact, nearly the same as tenure of land in England, with the exception that the land is all subject to the payment of "*Khiraj*," or tax to Government.

Land Tenure.

24. The first and universal land-tax was in all probability a share of the produce, and even when this was commuted for a fixed amount, it could only be paid from land that was cultivated. As payment of the tax, then, was a condition of holding land, so must cultivation have been, and waste land would become the property of Government, whose claims on it were not satisfied.

25. This is precisely the condition of land in Sind. Cultivated land is the property of private individuals, to whom, in many instances, it has been handed down by their ancestors for countless generations. It is theirs to cultivate, to sell, or to mortgage, or bequeath to their children, and subject only to the payment of the tax.

26. It has been objected, that the amount of tax being at the discretion of the Government, reduces the landowner to the state of a tenant, and constitutes the Government landlord; but except in so far as Government is absolute, the tax could not be legally raised above what was legal under the previous rulers; and so far from this being done, the tendency is all the other way, and a permanent settlement would remove this objection for ever.

27. The question of landownership has been complicated, by confusing *Jagheerdars* with landowners. Because the former paid no land-tax, it was thought they resembled the landed proprietor of England; but the reason they paid no tax was because they had no land.

28. A *Jagheerdar* is merely one who holds an assignment of the Government revenue of certain lands, and under Mussulman law the revenue could only be so assigned for state or for religious purposes. Supposing the grantee was a

landowner: the grant might be made in his own land, when he must be considered paying as landowner, and receiving as Jagheerदार. Other Jagheerदars receive from the landowners the taxes the latter would otherwise have paid to Government; and when the jagheer is resumed, on lapses, Government collects from the landowner, not from him who was Jagheerदार.

* 29. The landowner in Sind is called the Zemindar. The Zemindars are almost all Mussulmans; but Hindoo capitalists occasionally become purchasers, and still often hold land in mortgage.

30. Cultivated land, with facilities for irrigation, has a money value varying with the advantages of soil, locality, &c., and still more with the extent to which private rights of property in land have been respected. It bears the highest value in Upper Sind, and the lowest, perhaps, in the Hyderabad districts. Rs. 2 a beega is a common selling price in Upper Sind, but in the neighbourhood of large towns, from Rs. 8 to Rs. 12, or even more.

31. Land is very frequently mortgaged, and the usual terms are that the land shall remain in possession of the mortgagee (who enjoys the use of it in lieu of interest) till the money be repaid. It is also understood, that the value of any permanent improvement shall be paid for by the mortgager at the time of redemption. Very rarely a time is specified for foreclosure, if the land is not redeemed.

32. There is no trace of anything like right of cultivation by the cultivators, or any right except that of the Zemindar.

33. The custom with regard to resumption and grant of waste lands corresponded pretty nearly under the late Meers with what is described by Mr. Baillie* as the Mussulman law on the subject, except that the interest of the Meers, or of the local officers, was more looked to than the legal definition of what was waste land.

34. By *law*, waste land was that which had never been cultivated, or of which the owners were unknown. The *custom* was, to resume any land which had been allowed to lie fallow longer than the local Revenue Officer thought right, as well as what was waste; and under this pretence the officials often possessed themselves of, or gave to their friends, the best lands of a village.

35. Under the British Government, the practice has been to call upon the reputed owners of land that appeared to be neglected, either to give a written bond that they would cultivate, or one foregoing all claims to it. In the latter case, the land is given to anybody who will undertake to cultivate it.

36. Although, under the Meers, a title-deed was usually given with the land to the person undertaking to cultivate, the transaction not being strictly according to Mussulman law, the Kazees in Sind would award the land, if sued for, to the original owners or their heirs, while a Mussulman Punchayet of Zemindars would decide in favour of him who last cleared it. This causes constant disputes about land.

* The Land Tax of India. By W. B. E. Baillie. Smith & Elder, 1853.

37. The size of estates in Sind varies from five beegas to many thousand; the property of a Zemindar may be in one village, or he may have estates in different and distant localities. A whole village rarely belongs to one man, or to one family.

38. There are some kinds of land not cultivated, but yielding useful products, the proprietorship of which is not so well defined. Such are "Soonarees," salt places set aside for the manufacture of earth salt, the land forming the beds of dunds or lakes, the lotus roots in which belong to the fishermen, who have a proprietary right to fisheries similar to the zemindaree of land, the building land about village sites, &c.

39. The right to the beds of dunds is the only one I have seen lead to much dispute; but it would be the province of a Settlement Officer to ascertain and define all their rights, for they are all intimately connected with the cultivation.

40. Under the Talpoors, the right of proprietorship in canals was not well defined. Ownership involved the duty of clearance. Government canals were cleared at the expense of Government. This naturally led to a wish on the part of the Zemindars to disclaim the ownership of all but the small canals; but as between Zemindar and Zemindar the right of ownership of a canal (not Government) was strictly adhered to, no one could make a cut from a private canal without leave from the owner.

41. It seems to have been the custom to give any Zemindar, whose lands were at a distance from the main feeder, a right to cut a canal through the land of other Zemindars, without giving any compensation—a practice which has led to the cutting of that immense number of small canals with which the country is now intersected.

42. Under the British Government, in some places canals above a yard wide have been decided to be Government, and below private; while in others this has been decided according to "ancient custom," and encouragement given to the Zemindars to enlarge their canals, and to dig "Raj-wahs" (canals belonging to bodies of Zemindars) for several villages at once, in place of the smaller watercourses of separate estates.

43. There is no other huk or right of any kind in the land except that of the proprietor, with whom it is optional to make what arrangements he pleases for its cultivation.

44. Land, whether belonging to Hindoo or Mussulman, is usually cultivated in one of two ways. In one, the Zemindar finds the bullocks, seed, and all expenses except hand labour: the cultivator performs the labour, receiving in return a share of the produce. This is what in Sind is meant by the Zemindar's "Khood Kasht." In the other, the land is let for the season to the cultivator, who finds bullocks, seed, &c. as well as labour, merely paying rent to the landowner. This is cultivated by "Moojarat."

45. These arrangements, however, are not always strictly adhered to; and fortunately the Sindees are not wedded to any antiquated formula, but make

such arrangements as happen to be most suitable to the means of the landlord and tenant.

46. There are certain payments, which it is customary to make out of the produce before it is divided between the landlord and the tenant. These are wages to the artificers, the village watchmen, potters, barber, &c., and presents to the Moolla, charitable gifts, &c. These are nothing more than voluntary arrangements—beneficial, indeed, in a rude state of society, but which it is anything but desirable to define and render permanent by settlement under authority.

47. Many of the other expenses of cultivation are occasionally provided for in this way out of the common produce; but these, also, are matters of special agreement, and the terms may differ with the Zemindars in the same village.

48. Land is sometimes, but rarely, cultivated by hired labour: the labourer receives fixed wages, and the Zemindar takes all the produce.

49. Each Zemindar is perfectly independent of the others; one is in no way responsible for another on account of any Government due. There are no village communities that can be treated with as one body, without they choose to enter into a voluntary partnership.

50. Families often continue united, and their common property is managed by and in the name of one; but on the death of a proprietor, the individual heirs may, and frequently do, claim their separate shares. Generally speaking, the large estates would be found, on inquiry, to be the property of many individuals, male and female, though nominally held by one member of the family.

51. The hamlets in which the Zemindars and cultivators reside may contain one Zemindar and his family, dependents, &c., or many; but in the latter case, the hamlet is more or less distinctly divided into quarters, belonging to each Zemindar, and the largest proprietor is considered the headman of the village. The bazar forms the Hindoo quarter, and is common to all.

52. The hamlet is called a "Gote," and is usually situated on the lands of the village cultivated by the inhabitants. But in some villages, owing to the inundation, a permanent residence is impracticable, and the Zemindars and cultivators of several villages live in one place, which becomes a town; and in Sind this is generally called a "Kusba." These kusbas were apparently at first the gotes of one village, which retains the name, with the addition of "Thurr,"—as Thurr Sehwan, Thurr Boobukan, the lands on which these towns respectively are situated.

53. All the inhabited portions are in divisions, with well-known and defined boundaries; but the size of the division is very variable. The first division is into "Dehs," which may be entire, or again divided into "Mukans." It is often difficult to decide whether a division is a mukans subordinate to a deh, or of itself a deh; and it is of no consequence, as the boundaries of mukans are as well known as of dehs.

54. In the thinly peopled hill tracts, the localities are usually named after

the river which waters them, or into which they drain; and even there the boundaries are well known to the hill tribes.

55. The association of the Dehs and Mukāns into Tuppas and Purgunnas was a mere revenue arrangement, which has been frequently altered, and can be at any time without much inconvenience.

56. If the above sketch be correct, then Sind consists of tracts of waste land, the property of Government; and of cultivated lands, the property of individuals, who are subject to pay a share of the produce of their lands to the State; and it has always been usual for Government to contribute a certain portion of the expenses of cultivation, by clearing and digging the large canals, all other expenses being on the owner of the land. (Note III.)

57. Whatever may have been the tax originally imposed by the Mussulman conquerors of Sind, it is probable, with such uncertain cultivation, they would soon have to revert to "Buttai"; and it is certain that at the time of the British occupation a share of the produce was (and it still is) considered to be the fundamental claim of Government, and all other modes of assessment to be merely temporary commutation of buttai. (Note IV.)

58. The share taken by the Talpoors varied from a fourth to half—in no case exceeding the latter, which was the most that could be taken under Mussulman law. There were fees levied besides, under the name of "lbwab"; but when half was taken in buttai, the Meer had generally expended a good deal of money on canals or bunds.

59. In some districts, a per-centage was taken as water-rate, under the name of "Hukab," while in others the Zemindars had to find labourers to dig and clear out the Government canals, Government only paying for the labourer's food, estimated to be about a third of the expense.

60. The principal modes in which buttai was commuted under the Talpoors were:—

1st.—Khasgee, or a fixed rate per beega in kind.

2nd.—Ravaree, or cash-rents.

3rd.—Dana-bundee, or by an estimate of the produce.

4th.—Farming out the revenue to a contractor.

61. Khasgee was the most popular mode of commutation. It was often granted at very low rates (Kum rickab) in newly cleared lands, and the rates were lowered or raised according to the capabilities of the soil, facilities for irrigation, and expenses of cultivation.

62. The holders of khasgee leases were always entitled to remission for bad crops. The amount to be remitted was decided by an arbitrator or Ameen, appointed by Government, who went round the fields when the crop was nearly ripe, and wrote a list, with the measurement of each field, in which he considered the crop had failed. This list, called the "Bunda Nuzurdeed," was given to the Kardar. The crops were measured in full, but the amount of each kind shown in the bunda nuzurdeed was written off in the Kardar's accounts, and the assessment on the remainder charged to the leaseholder.

63. The khasgee assessment varied both with the soil and the crop. When wheat was charged four cassas a beega, gram, mustard seed, &c. were charged only two cassas. The leases formerly granted under the Meers may still be found in most villages, and very valuable information may be collected from them as to the capabilities of the different localities and soils.

64. In some districts a custom prevailed, by which the khasgee leaseholders could pay the average price of the grain for the previous six months, instead of paying in kind. This was called the "Eera rickab."

65. The rawuree, or cash assessment, differed from the khasgee only in the tax per beega being fixed in cash. It was principally levied on the more valuable crops, such as indigo, cotton, and sugar-cane. The rates were nominally very high, but liable to great reduction by a right to remission (Pullo nuzur-deed), similar to that given in khasgee assessment.

66. Dana-bundee was merely a temporary estimate of the probable yield of any small patch of cultivation, and from which the amount to be paid for that season was fixed.

67. Farming out the revenue does not appear to be a very frequent practice, and it was one very unpopular with the cultivators. The contract was given to the highest bidder, and no attempt seems ever to have been made, to make a fixed settlement with the Zemindars; who, however, did occasionally take the contract, to save themselves and cultivators from the extortions of a Hindoo contractor.

68. Under the British Government, buttai has been continued up to the present day, at the reduced rate introduced by Sir Charles Napier; and the same modes of commutation have, with some modifications, remained in use.

69. The estimating of crops said to have failed was found to lead to so much fraud, that the pullo nuzur-deed was abolished, after which khasgee fell into disuse.

70. For the high but varying cash-rents, with right to remission, a lower scale, but with no right to remission, except for flooded crops, was introduced, and its adoption made optional with the Zemindars.

71. Dana-bundee has continued in occasional use as a temporary expedient, but only in the most trifling claims.

72. The unexpired contracts of the Meers were continued for the terms they had to run, but very few of a similar nature were entered into afresh.

73. In 1850-51, an attempt was made to settle a fixed assessment with the Zemindars, founded on the average of the four previous years. I may safely say these settlements gave satisfaction neither to the Zemindars nor the Revenue Officers. Where the cultivation is shifting, an assessment founded on the average of so short a time could never be a fair one, and the occurrence of two very bad seasons soon after the settlement helped to make their failure more complete.

74. These assessments have all been tried, and we are in a position to judge of their working; but not so the other kinds, which have been intro-

duced in the older possessions, such as the Ryotwaree of Madras, the Zemindaree (so called) of Bengal, and the Village Settlement of the North West Provinces, or the more recent Settlements in the Dekkan. But though these have not been tried in Sind, we can judge pretty nearly how they would be likely to operate on the interests of the Government and the people.

75. As there are no ryots having any vested rights in the occupation, or the cultivation of the land, no ryotwaree settlement can be made in Sind, although the effect likely to be produced by any proposed settlement on the labourer need not be neglected.

76. Although there are no ryots possessing a hereditary right to cultivate, there is a very numerous body of small landholders, whose rights would soon be lost, were they placed at the mercy of the larger proprietors, in introducing anything like the zemindaree of Bengal; and the system is not adapted either to the customs of the people, or the shifting and uncertain nature of the cultivation.

77. As there are no village communities, a forced partnership, and mutual responsibility, could only lead to confusion and failure; besides tending to prevent individual enterprise and competition. For however convenient a village settlement may be as an arrangement for collecting a revenue with certainty and promptitude, it seems little calculated to encourage advancement.

78. Of all the modes adopted in India, the "New Dekkan Settlement" appears the best calculated for Sind; and were the cultivation more constant and certain, a similar one might be introduced, with every prospect of success.

79. None of the Native modes of assessment, even as modified under the British rule, are such as it would be desirable to perpetuate; but in the absence of a survey they were, perhaps, the best that could have been devised; and under their operation, the condition of the labouring classes has been probably as good as in any part of the world, and better than in most, and the landholders, living on the rent of their estates, have, while contributing largely to the revenue of the Government, been able to attain a position much more independent than that of the Jagheerdars. They are now the most respectable, the best educated, and the most intelligent class in Sind; and any revenue system not adapted to the wants and condition of the Zemindars would be fatal to the prosperity of the province.

80. Even *buttai* has its advantages as well as its disadvantages. However bad the season, if there is any produce, two-thirds belong to the cultivators: no oppressive official can seize the helpless defaulter's property, or extort duties for delay—he can take his share, and can claim no more. It is true the more labour and capital were expended, the more Government took; but this was partially remedied, by giving the more valuable and expensive cultivation at fixed cash-rates.

81. Khasgee was so far an improvement on *buttai*, that the crops had not to be watched on the part of Government, or divided by a tedious and complicated process; but Government was still burdened with payment in kind, and

the smaller the general yield of the crops (and consequently the price of grain higher), the heavier was the money value of the tax. Khasgee entailed, also, the great evil of annual measurements and remissions.

82. Farming out the revenue, on the plan adopted by some of the Meers, was an easy way for them to collect a certain income, as the contracts were given to capitalists who were able to pay whether the crops were good or bad; and sometimes, by expending money in improvements, the contractors enriched themselves, and at the same time improved the district they had in lease; oftener they impoverished the land by excessive cropping, and, by encouraging the Zemindars and cultivators to take advances at exorbitant rates of interest, inextricably involved both in their clutches.

83. The attempt to lease out villages at fixed rates to the head Zemindars, as recommended by Sir George Clerk, has not succeeded. The smaller landholders were as unwilling to be placed at the mercy of the large Zemindars as the others were to take them, and only consented to escape being themselves responsible for a fixed revenue; and even the larger and more wealthy Zemindars generally transferred their liabilities wholly or in part to Hindoo capitalists; so that in the end, if not at first, the plan only differed from the Meers' contracts, in Government agreeing to bear the loss in bad seasons.

84. Had the principal Zemindars retained the contracts in their own hands, there would have been no improvement for the bulk of the Zemindars and the cultivators, as the complicated process of buttai had still to be gone through among themselves.

85. The plan entailed great loss on Government, because, with a shifting cultivation, losses must occur in some villages every season, and remissions had to be granted in them, although the general produce of a district exceeded the average; Government had to bear all the losses of bad seasons, and to lose even when cultivation was changed from one village to another, and without any chance of compensation in abundant years; and at the same time, the profits were so uncertain as to make the speculation a gambling one for the Zemindars, had they not transferred their liabilities to others.

86. The leases failed even in the temporary purpose for which they were proposed, many giving the Revenue Officers leisure to devise a more permanent assessment. The investigation of claims to remissions proved more troublesome than the buttai even; and as regards a permanent assessment, we are in a worse position now than before the introduction of the leases, by the want of the correct accounts of produce and cultivation that would have been otherwise obtained during the years of the leases.

87. The cash-rents were most generally adopted in Upper Sind: they were vastly superior to either of the other systems; and if, instead of the people having been over-persuaded to agree to fixed leases, the cash assessment had been modified, to suit different soils and localities, and by the grant of moderate remissions, the Zemindar would now be better prepared for the introduction of a permanent and universal cash assessment.

88. Under the British Government, the cash-rates in Upper Sind were Rs. 2-8-0 for rubbee, and Rs. 1-8-0 for khureef and peshrus crops, besides a fee of 6 per cent. on the assessment. Beyond this, there was no adaptation to soil or produce, to facilities for irrigation, or disposal of produce. The consequences were, that the cash-rates were only agreed to where the lands were good, and markets and easy modes of transport available, and the crop one which would yield a profit at the rate laid down; while in localities distant from markets, or where the soil was bad, the cash-rates were not adopted, or, if adopted, had to be given up.

89. How different this was from the discriminating khasgee rates of the Meers, may be seen by comparing them, after converting the grain of the khasgee into cash. Taking wheat at Rs. 20, and mustard seed at Rs. 15 per kurwar, the following are the rates in two of the Sehwan districts:—

	Meers' Khasgee Rates per Beega.			British Cash-Rates.		
	Rs.	a.	p.	Rs.	a.	p.
<i>Wheat.</i>						
In the rich lands of Dhull, in the Lamlanee Districts	3	5	0	2	10	4
In the light poorer lands of Dadoo	1	12	0	2	10	4
<i>Mustard Seed.</i>						
In Dadoo	0	14	0	2	10	4

90. The Meers' rates would be further reduced by remissions, though least would be required in the richest and most highly assessed lands; while the British rate was subject to no deduction for anything but injury by inundation, in which case the Zemindar could claim buttai for that season.

91. The adoption of the cash-rates was made optional; it was, in consequence, principally chosen in those places to which it was adapted, and was generally successful. In a few places, it was given either by Government, or by the Zemindars who had taken leases, to Hindoo capitalists. In these cases the cultivators and Zemindars paid the contractor buttai, and most of the evils appertaining to the Meers' contracts prevailed. (Note V.)

92. Sind requires an assessment which, like the Meers' khasgee, is accommodated to the *annual* capabilities of the localities, and one in which a settlement is made, if possible, with every individual proprietor. The difficulty is to fulfil these conditions without annual measurements and "Junswar" rates. The assessment should doubtless be in cash; and judging from the success attending the sale of buttai grain to the Zemindar for the last two or three seasons, there does not seem any chance of difficulty on this score.

93. Annual measurements, such as have hitherto been made in Sind, are very bad, and varying the rate on the same land with the crop is still worse. A survey like that made for the Dekkan Settlement would take away all objection from the former, and under liberal rates the latter might be altogether abolished.

94. I should think a sufficiently accurate survey would not be expensive

in Sind, including a division into fields of convenient size. The Zemindars and villagers would be willing, and might be fairly called on to contribute all the common labour; but whatever the cost, it must be done eventually, and that which is done soonest will be the best and cheapest; for every year that it is left undone, there is much loss to Government and the people, and the requisite data are becoming fewer and more difficult to understand, as the records become obliterated, and the old servants die off, and old boundaries lost sight of.

95. Supposing, then, a survey made, and the villages divided into fields as small as the smallest holding, and laid down in a map, on which they could be numbered and recognized, with a record of their owners' names, &c.: what data are there from which to fix the relative value and capability of each? If the village was in buttai, the kusras show the *produce* of the village, and, with the help of the Zemindars, an approximation to the produce of each zemindaree; but the accounts tell nothing of how much land was cultivated to obtain that produce. If in cash or khasgee, the accounts will show the amount of land cultivated, but tell nothing of the produce.

96. The Meers' khasgee rates will show, however, if care be taken to distinguish between regular rates (poora rickab) and low rates (kum rickab) granted for special purposes, what was in those days considered a fair assessment on *cultivated land*; and the actual amount levied after deducting the remissions will show what was easily paid, but in kind. Difference in the share taken in buttai, and indeed all variations in the Meers' rates (with the same exceptions as above alluded to in special cases), will afford most valuable information as to the capabilities of the land. I do not think so many subdivisions will be found necessary in Sind as appear to have been adopted in the Dekkan Survey and Assessment; but this can only be decided when all the available data are collected and arranged.

97. It would be impossible in Sind to levy anything, however small, on any but the cultivated land—that is on the cultivation; so that the only question to be settled is, what are the capabilities of the soil when cultivated, and we get rid of the question of how long the land is likely to lie waste or fallow.

98. Some lands, capable of yielding the best wheat crops when the supply of water is seasonable, can only grow the inferior crops of mustard seed, muttur, &c. when the water dries up either too soon or too late. The bulk of the inundation land, however, will not bear a heavy assessment, even when yielding wheat, and the liability to this fluctuation in the time of becoming fit for seed might be sufficiently provided for by a moderate but permanent rate for all crops, and the owner would then be encouraged to spend money in controlling the water supply.

99. The rent levied by the Zemindar can always be ascertained, and this also will afford information in fixing the rate. Rent in Sind depends most (besides the caprice or the liberality of the landowner) on the expense of cultivation: the greater the expense, the less the lapa, zemindarce, or rent.

100. This must also be the case with the assessment, though it was the reverse in Sir Charles Napier's buttai and cash-rents, owing to their adoption being made optional. On khureef wheel lands the produce is greater, and the Zemindars willingly paid a rupee and a half a beega for the Government share, though, owing to the expense of bullocks, wheels, drivers, &c. the cultivator could only afford to pay him a very low rent; while on moke lands, though the Government share was not worth a rupee and a half, there being no bullocks, &c. to pay for, the rent paid to the Zemindar was double or treble that on wheel land. The excess of assessment on wheel land was not intentional, but was owing to the choice being between buttai and the cash-rates; and it became virtually a tax upon the extra labour and expense bestowed on the superior kind of cultivation. Had all been in buttai, of course the result would have been the same.

101. The enormous difference made between khureef and rubbee crops in the British cash-rates arose, probably, from the higher relative price of the latter at that time. There is much less difference now, and the more certain productiveness of jowaree than of wheat makes up for what little difference there is, or probably will be. That Rs. 2-8-0, charged for the rubbee, was too much, was fully proved by the fact of very few Zemindars agreeing to it.

102. The Meers' khasgee rates were higher (in grain) for khureef than rubbee, 9 cassas of jowaree, and 7 of wheat, being a common poora rickab on the best lands. Khureef crops are always grown on pukka lands (*i. e.* lands above the usual inundation level); rubbee is grown on both pukka and kutchia (*i. e.* inundation land), but only wheat and barley on the former, when they were charged usually a cassa more than when grown on kutchia lands. The mustard seed, muttur, &c. were charged about half as much as wheat on kutchia land; but the difference, though nominally owing to the crop, corresponded with the soil, as will be seen in paragraph 18.

103. On the whole, there appears to be no good reason for making the rate vary with the season, an allowance for difference of soil and facilities for irrigation being fully sufficient to meet all contingencies which can be foreseen, and those which cannot must be provided for by remissions.

104. Under the Dekkan Settlement, a cultivator can diminish his liabilities, by giving notice beforehand of what fields he does not intend to cultivate, and they are made over to others; losses and injuries on the actual cultivation fall on him, unless special remissions are granted as a favour. From various causes, the Zemindars in Sind have little faith in remissions, subject to the discretion of the Revenue Officers. Under all the Meers' settlements, in commutation of buttai, remissions were claimed as a right, and, if possible, they should still be so. Nothing will, I am convinced, tend more to render the settlement popular, give the Zemindar confidence to extend cultivation, and ultimately to improve the revenue.

105. It has been fully proved, by the frauds committed by the Native Ameens in making the khasgee remissions in Upper Sind, that they cannot be

trusted to estimate the deficiencies of crops. But by extending the privilege of claiming buttai (by a certain date) to all cases in which the owner of the land considered the Government share unequal to the assessment, a safe and easy remission is at once provided.

106. It may be objected, that this is merely making it optional with the Zemindar each year whether he will pay the assessment, or go back to buttai; but if the assessment is within the value of the Government share, he is not likely to give up the profits of the former, and subject himself to all the annoyances of the latter; and as the cultivation becomes more valuable by improvements in irrigation and culture, buttai will naturally become obsolete.

107. The chief difficulty appears to be to determine down to what subdivisions these remissions are to be made. However desirable it might be to settle the remissions with each landholder, it would be impossible, by the buttai system, to grant the remission by any less divisions than villages.

108. Supposing, then, a village with ten landholders, large and small, in it, and the assessment settled: a holder of 20 beegas complained that his crops were bad, while those of the other nine holders were good. Government could not appoint buttaidars, field watchmen, &c. for the 20 beegas; nor could the nine Zemindars be fairly made to give up their profits to please the tenth, but they might be made fairly enough to take buttai of, or make some agreement with him, by which his losses should be paid out of their profits. When the excess of good crops would not pay for the deficiencies of the bad, all would agree to buttai. By this expedient, we give up to a certain extent the principle of settling with each proprietor; but if the rates of assessment are liberal, the remission would, it is hoped, become less necessary every year, and at the worst, no Zemindar would ever be called on to pay more than the Government share of the produce of the land. The proper claim of Government, however, is to a share of what the land will produce under ordinary circumstances, and does not include a share of what is produced by the employment of extra skill and capital; and though a village claimed to have the ordinary crops buttaied, the villagers should not for that reason be called on to give up a third of the produce of indigo, sugar-cane, or other crops, whose value depends, not on the soil, but the labour and capital bestowed on their cultivation. (Note VI.)

109. Under this plan, a Zemindar who had estates in several villages might be receiving remission in one, though the losses in it were more than balanced by the profits in his other estates; but there seems no just reason why the fertile villages should be called on to pay for the barren, because a Zemindar happened to have land in both.

110. The following is a brief outline of what seems to me a practicable settlement for Sind, and the steps necessary for carrying it into effect:—

1st.—Substantial marks must be put up round the boundaries of villages.

2nd.—Government forest and waste land must be separated from the appropriated, and the latter divided into fields of the size now in use, and the

fields named or numbered. (It must also be decided what proportion of land may lie fallow, without reverting to waste or Government land.)

3rd.—A survey and map must be made, showing every field or other division, with its appropriate number.

4th.—A kusra, or field-book, with the fields numbered as in the map, and giving the usual information of length, breadth, area, and occupancy, soil, &c. and modes in which the field is capable of being irrigated.

5th.—It must be clearly and permanently laid down and recorded to what extent the canals, bunds, &c. on which the field is dependent, are to be kept up by Government.

6th.—From these data, accurately ascertained, and all the information that can be collected as to the previous assessments, produce, &c. and results, it will not be difficult to find out both what a district can easily pay, and what is likely to prove a fair distribution on each village and cultivated field. (Note VII.)

111. The rates of assessment must depend, in some measure, on the extent to which irrigation expenses are to be borne by Government. Nothing can be more unjust than the present system, by which proprietors, whose fields can be irrigated by the close and certain supply of water from the river, and whose grain can at once be transferred from the field to a boat, are exempted from payment of water-tax, while those whose lands are situated far from the river, and dependent on the more precarious supply of water from a canal, have to pay the tax in addition to an equally heavy land-tax, as is charged to the more advantageously situated Zemindars on the banks of the river. When, instead of a fixed tax, the Zemindars supply labour, the burden becomes still more unequal, as the further from the mouth of the canal, the more the labour to be provided.

112. The proper principle to go on seems rather for Government to execute the large and expensive works, whether canals or bunds, placing all lands on as equally favourable a position as possible, and then considering the differences which will still remain, as one of the conditions for lowering or raising the land assessment, in which all water-rates, whether in cash, kind, or labour, should be incorporated.

113. When the work to be done by Government was finally fixed, the Zemindars would be more ready to execute what was required of them, and would not, as they are now too apt to do, hang back till the end of the season, in hopes of Government doing it for them. If, after the irrigation works to be kept up by Government had been agreed on, and the assessment settled, Government thought fit to execute any additional and expensive works, an additional levy might be made as water-rate, or as an addition to the land cess on account of increased capabilities of the land, and these, and not the amount expended, ought to decide the additional sums to be charged.

114. If the tax laid on the land is so light as to enable those who live on it to earn a livelihood for the whole year, Government may fairly expect them

to employ the months during which, in Sind, there is no other farm work, in labouring on their canals; and such small canals, therefore, as can be cleared by the cultivators between the sowing and reaping of the rubbee, should be left entirely to them; but as the expense of clearing has to be defrayed out of the zemindaree lapa or rent, by the landowner, and is not provided for in the cultivator's share, care must be taken to leave enough rent to pay the cultivators for their labour as excavators.

115. If the principle is carried out of assessing land at the value of the Government share of what it yields, when cultivated in the most ordinary manner, with the common crops, there will certainly be a considerable reduction on the present rates of cash assessment; but, as already stated, except on wheel and well lands, these rates have scarcely ever been accepted, and there can be little doubt that the reduction would be followed by a more than equivalent extension of cultivation.

116. Extension of the common kinds of cultivation beyond a certain limit is scarcely desirable, and would cause such a diminished value of the articles produced, as to render necessary a reduction of the beegotee assessment. Some steps, therefore, will be necessary, to facilitate and encourage the growth of crops less perishable, and more fit for exportation, than those now raised.

117. Take, for instance, sugar-cane, cotton, and indigo, for all of which there is abundance of suitable land; and as they succeed very well in small quantities, we may presume the climate is not unsuitable. Their growth is now limited by the difficulty of obtaining water during a sufficient number of months in the year, and at the proper seasons. Sugar-cane requires water for nearly ten months, but there is only a supply in the canals for three or four. Indigo and cotton require to be sown early in the spring, but water does not usually fill the canals till midsummer. The only option left is to build pukka wells, or plant in the very low grounds, and by the river banks. The latter are always liable to be flooded or carried away, and the interest of the money required to build a well eats up all the profits of the cultivation.

118. Two things, therefore, are required, before any great extension of these valuable crops can be expected, viz. a supply of water, extending through a longer and more seasonable period than is afforded by the present inundation canals, and better protection to the low lands from flooding; and these are the means, also, by which both the produce of the common kinds of cultivation will be increased, and the samples improved.

119. A survey, including levelling, will best show how these objects can be obtained. The double slopes, so favourable for inundation canals, would be unfavourable to canals like the Ganges canal, or those being constructed in the Punjaub; but by survey only can either the amount of the difficulties be ascertained, or the way to overcome them. Failing all other routes, high land for watercourses can always be found on the eastern and western borders of the valley.

120. Protecting the low lands by bunds and sluices is simply a matter of

expense, requiring little engineering knowledge or skill, as constantly recurring losses have already shown when they are required.

121. The ruins of large towns, remains of magnificent tombs, and records of flourishing factories, have led to the belief that Sind was once more populous and prosperous than now. The total absence of any relic of permanent works of irrigation, of roads, bridges, or any works of public utility, may reasonably throw a doubt on this; but there cannot be a doubt that there are in the province great capabilities for improvement. With a supply of water all the year round, there is scarcely a useful product of temperate or tropical countries that cannot be brought to perfection, and there need not be any fear but that the ultimate results of improvement would justify a very considerable expenditure of money.

(Signed) A. YOUNG,
Deputy Collector.

NOTES.

I. Paragraphs 7 & 8.—The levels in Sind, though favourable for inundation canals, are not so well calculated for permanent irrigation canals as the Doab of the Punjab. In these, a high ridge runs along the middle of the country; in Sind, as a general rule, the middle line (between the Indus and the hills) is the lowest. To irrigate both these slopes, one branch must run along the edge of the river, and the other under the foot of the hills. The banks of the former must be strong enough to resist the river in high inundations, and the latter the rush of water from the hills after rain. These conditions, however, only add to the difficulty and expense, and to an extent that can only be found out by a survey.

II. Paragraph 17.—I see the Punjab Agri-Horticultural Society have sent specimens of "Kullur" (the salt soil) to be analysed, with a view to the application of some remedy. Seeing that most of the table salt used in Sind is made from the washings of the kullur, there can be no doubt that chloride of sodium is the principal ingredient, and the presence of carbonate of lime is sufficient to account for the occasional appearance of the efflorescence of carbonate of soda on the surface, in a dry atmosphere, and deliquescent chloride of calcium in a moist one. There can be also little doubt that the Native remedy of copious flooding with fresh water is the appropriate, if not only one.

III. Paragraph 56.—Reaping expenses, &c. being taken from the "gross heap" of the produce before buttal, were therefore partly contributed by Government.

IV. Paragraph 57.—Nothing will be so likely to render a settlement popular, as to concede this point to the Zemindars, viz. that they cannot be legally called on to pay more than the value of the Government share, and that the rest is unalterably theirs.

V. Paragraphs 90 & 91.—Nobody of course agreed to pay cash-rents for mustard, or for the poorer kinds of wheat land. The rates given in paragraph 89 are what they would have had to pay in the event of the owners taking a cash lease.

VI. Paragraph 108.—This would be very different from mutual responsibility for defaulters. It would be a mutual insurance against losses.

VII. Paragraph 110.—I think it would be advisable at once to collect and preserve copies of every lease, khasgee or other, that can be found in the hands of the Zemindars, or in the Meers' duffurs. They will show the relative value of the land in different villages, and this is all that has been done either in the settlement of the North-West Provinces, or in the revised settlements of the Punjaub, the villagers being left to settle among themselves the payments due from each field. In the Dekkan settlement, perhaps too minute sub-divisions of soils were attempted, and the plan of giving a numerical value to each quality was too mechanical for the decision of a question affected by so many circumstances; still it seems reasonable to suppose, that the Native local knowledge and experience would lead to a fairer distribution of the "Jumma," when guided and controlled by European science and justice, than when left to the influence of Native intrigue.

(Signed) A. YOUNG,
Deputy Collector.

True copy)

J. GIBBS,
Assistant Commissioner.

No. 63 of 1855.

REVENUE DEPARTMENT.

From H. B. E. FRERE, Esq.,

Commissioner in Sind,

To the Right Honorable LORD ELPHINSTONE, G.C.H.,

Governor and President in Council.

Dated 12th February 1855.

MY LORD,

I have the honour, with reference to my previous letter as per margin, to report the following as the arrangements I propose for carrying out the preliminary revision of the assessment during the current season.

No. 20, dated 12th January 1855, forwarding copy of Instructions issued to the Collectors for a Rough Survey and Assessment in Sind.

2. As already intimated, I have directed two of the Deputies, who had become, under the new arrangements, supernumeraries in the Hyderabad Collectorate, to join the Senior Deputies in Hyderabad and Kurrachee, engaged in the revision of assessment. Under these orders, Captain Hodgkinson has proceeded to assist Lieutenant Phillips, engaged in the settlement of Sehwan, and Mr. Stack, C. S., to assist Lieutenant Jameson, who is employed in the Sahitee districts.

Commissioner's letter to Government No. 20, of the 12th January, para. 18.

Schwan, Johee, Majenda, and Kotree.

Nowshera and Kundiara, with Mora.

3. Anticipating that the arrangements I proposed, for placing one of Major Jacob's Lieutenants in charge of the Boordica district, in lieu of Lieutenant Lester, would be approved by your Lordship in Council, and as the short working season is rapidly passing, I have directed Lieutenant William Lester, on being relieved in the charge of Boordica by Lieutenant Merewether, Second in Command under Major Jacob, to put himself under the orders of Lieutenant Cowpar, in charge of the Roree districts, where the work of revising the assessment is one of greater urgency and labour than anywhere else, and where it is most desirable to do as much as possible this year.

Paragraph 32 of Commissioner's Letter to Government No. 446, of the 20th December last, on the subject of the new Establishments.

Roree, Gotekee, and Oobowra.

4. On Captain Southey being relieved by Mr. Kembball, in the charge of the judicial duties at Shikarpoor, I propose to place him in charge of one of the districts at present entrusted to Ensign Wallace, so as to enable the latter Officer, who has shown great fitness for such a duty, to devote himself to revise the assessment of the other.

5. To give similar assistance to Lieutenant Ford in charge of the Larkhana districts, I would propose that Lieutenant J. Gordon, of the 1st Grenadiers, at present Adjutant of the 2nd Belooch Battalion, and who has passed in Sindee, be appointed to officiate as an Extra Deputy Collector, and placed under the orders of Lieutenant Ford.

6. To aid Lieutenant Tyrwhitt in carrying out the measures in Omercote and the Narra, which are the subject of my letter noted in the margin, I have obtained the temporary aid of Ensign Carr, of the 6th N. I. He is not at present eligible for permanent staff employ, and his being detached is therefore only a temporary expedient, and he is subject to recall at a moment's notice, whenever the Brigadier General Commanding the Division considers that his services are required with his Regiment.

7. While, however, employed under Lieutenant Tyrwhitt, he should, I think, have the rank and pay of a Supernumerary Deputy to the Collector and Magistrate.

8. Should these propositions be approved, the several Officers named will stand thus, as Supernumerary Deputies to the Collector and Magistrate:—

Kurrachee.

Captain Hodgkinson, 28th N. I., attached to the Deputy Collector in charge of the Schwan districts.

Hyderabad.

Mr. Stack, C. S., attached to the Deputy Collector in charge of the Sahitee districts.

Ensign Carr, 6th N. I., temporarily attached to the Deputy Collector in charge of the Meerpoor districts.

Shikarpoor.

Lieutenant W. Lester, 2nd Grenadiers, attached to the Deputy Collector in charge of the Roree districts.

Captain Southey, to have charge of the Nowshera and Shikarpoor districts.

Ensign John Gordon, 1st Grenadiers, attached to the Deputy Collector in charge of the Larkhana districts.

I have the honour to be,

My Lord,

Your Lordship's most obedient humble Servant,

H. B. E. FRERE, .

Commissioner in Sind.

Commissioner's Office, Camp Khayrpoor, 12th February 1855.

SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.

NO. XIX.—NEW SERIES.

SURVEYS

BY THE

GREAT INDIAN PENINSULA RAILWAY
COMPANY

OF THE

NORTH-EASTERN EXTENSION

FROM

MUNMAR TO MIRZAPORE.

Bombay:

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1855.

CONTENTS.

PAGE

<p>Report by the Chief Resident Engineer, Great Indian Peninsula Railway Company, dated 6th October 1854, on the Survey of the North-Eastern Extension from Munmar, upon the western border of Khandeish, to Jubbulpore, in the Valley of the Nerbudda.</p> <p>Appendix No. 1.—Return of Traffic on the Boorhaupoor and Indore Road, from April 1853 to May 1854</p> <p>Appendix No. 2.—Ditto ditto on the Agra and Bombay Road, from April 1853 to May 1854</p> <p>Appendix No. 3.—Return of Goods sold in four bazars, and of Goods passing four points in Nimar, for the year 1853</p> <p>Appendix No. 4.—Statement of Gradients</p> <p>Appendix No. 5.—Statement of Curves</p>	<p>1</p> <p>34</p> <p>35</p> <p>36</p> <p>37</p> <p>41</p>
<p>Report by the Chief Resident Engineer, Great Indian Peninsula Railway Company, dated 20th July 1855, on the Survey of the North-Eastern Extension from Jubbulpore, in the Valley of the Nerbudda, to Mirzapore, in the Valley of the Ganges</p> <p>Appendix No. 1.—Letter from the Collector and Magistrate of Allahabad, No. 10, dated 23rd February 1854</p> <p>Appendix No. 2.—Statement of Passengers and Vehicles which crossed Bulwa Ghaut Ferry from 16th June to 31st December 1853</p> <p>Appendix No. 3.—Statement of Gradients</p> <p>Appendix No. 4.—Statement of Curves</p>	<p>43</p> <p>57</p> <p>58</p> <p>59</p> <p>60</p>

GREAT INDIAN PENINSULA RAILWAY.

REPORTS OF THE NORTH-EASTERN EXTENSION.

FROM MUNMAR TO JUBBULPORE.

To the COMMITTEE OF DIRECTORS of the
GREAT INDIAN PENINSULA RAILWAY COMPANY.

GENTLEMEN,

I have the honour to report to you upon the subject of that portion of the North-eastern Extension which has been laid out and surveyed during the last working season, and of the further examination of the Sahyadree Range which has been made with the view of ascertaining whether a better ascent to the Deccan towards Khandeish can be found for the railway than by the Thull Ghaut. I shall also submit to you my views upon the comparative engineering merits of the Thull Ghaut line, and of the projected line from Bombay to Surat, and thence up the Taptee Valley to Khandeish.

2. The length of railway that has been surveyed during the last season, in a north-eastern or trans-peninsular direction, is $447\frac{1}{2}$ miles, and extends from the town of Munmar, upon the western border of Khandeish, to Jubbulpore, in the Valley of the Nerbudda, and distant $606\frac{1}{2}$ miles from Bombay.

3. The Maps, Plans, and Sections* which accompany this Report are,—

No. 1.—Map of the Khandeish Collectorate, showing the proposed Extension of the Great Indian Peninsula Railway Company.

No. 2.—Map of the Country along the course of the proposed Extension from Asceerghur to Jubbulpore.

No. 3.—Plan of the proposed Extension from Munmar to Julgaum.

No. 4.—Ditto from Julgaum to Nimbola.

No. 5.—Ditto from Nimbola to Asceerghur.

No. 6.—Ditto from Charkeira to the river Towa.

No. 7.—Ditto from the river Towa to Bunkerry.

No. 8.—Ditto from Bunkerry to Katiotia.

No. 9.—Ditto from Katiotia to Jubbulpore.

No. 10.—Section of the proposed Extension from Munmar to Julgaum.

* The original Plans furnished with the MS. Report were found too bulky for publication. A general Map, however, of the district from Munmar to Mirzapore, has been annexed.

- No. 11.—Section from Julgaum to Nimbola.
- No. 12.—Ditto from Nimbola to Asseerghur.
- No. 13.—Ditto from Asseerghur to Charwar.
- No. 14.—Ditto from Charwar to the river Towa.
- No. 15.—Ditto from the river Towa to Katiotia.
- No. 16.—Ditto from Katiotia to Jubbulpore.

4. No plan has been made of the portion of the line between Asseerghur and Charkeira, because it was inexpedient to spend valuable time in surveying a district which was for the most part covered with jungle, and in making a plan upon which there would have been nothing of importance to represent: a description of the course of this part of the line will, however, answer our present purpose, particularly as full details are given upon the section.

5. Mr. Graham commenced these operations at a very early period last season, and conducted them unremittingly until the close of it. The care and ability which he has evinced, not only in carrying out my instructions, but also in the exercise of his own judgment, and in his frequent and lucid reports, call for my full acknowledgment, and merit your highest approbation. He has been very ably seconded throughout the season by Mr. Darke; and the assistance rendered by the new officers, Messrs. Bodington, Hawkes, Winteringham, Hawkes junior, and W. B. Wright, since their arrival in India last December, has more than answered my expectations.

6. Before I proceed to the description of the extension beyond Munmar, it will be advisable to allude to a few particulars concerning the line from Wasindree to Munmar, which affect its merits, and bear upon the important question of the selection of the best route for the railway to Khandeish.

7. In paragraph 152 of my Report of the 14th September 1852, I stated my opinion that it would be practicable to reduce the works upon the line between Shahpoor and Kussara, whenever it was laid out for construction; and in paragraph 181, that the tunnel, 387 yards long, between Egutpoora and Nassick, and the heavy earthwork adjoining it, might be greatly reduced, and the gradients flattened, by an alternative line. It was not expedient to retard the progress of the extensive surveys last season, by employing any of the officers in carrying out these improvements; but the opportunities of further examining that part of the country, of which I have since taken advantage, have convinced me that they can be effected.

8. Although I am unable to arrive at the amount of saving that might be made in the estimate by means of these reductions in the works, yet it is advisable to draw attention to them, in order that it may be understood that the estimates for the sections of the line from Wasindree to Kussara, and from Egutpoora to Nassick, were partly framed for a more expensive line than it will be necessary to construct.

9. By the alterations in the Thull Ghaut incline, which were reported to you on the 12th September 1853, a saving of more than a mile was made in the length of the line, reducing the distance from Wasindree to Munmar to 109 miles.

10. All the works between Wasindree and Munmar were estimated for a double line, except the permanent road ; but the Honorable Court of Directors have since ordered, in their Despatch of the 17th August 1853, "that bridges and difficult works should be constructed suitable for a double line, while the ordinary works and embankments should be made for a single line of rails, but so that they may be adapted hereafter for a double line, if the increasing traffic should render the addition advisable."

11. It therefore now becomes necessary for me, in conformity with that recommendation, to deduct from my previous estimate the probable cost of the extra width of the earthwork.

12. The estimate of the Thull Ghaut incline, which I reported to you in September 1853, after considerable improvements had been effected there, should also be substituted for that of September 1852, and a similar reduction be made, in order to adapt it to a single line.

13. It has also been requisite to increase my estimate of all the permanent way to the extent of £3 per ton, in consequence of a great rise that has since taken place in the market prices of iron materials.

14. With these alterations, the estimate of the extension from Wasindree to Munmar (single line) will stand as follows:—

Earthwork	£187,900
Tunnels, viaducts, bridges, and culverts	217,100
Permanent way, fencing, level crossings, &c.	333,200
Establishment charges, engineering, and contingencies	82,300
Rolling stock, and stations	94,400

Total..... £913,900

15. It would be a matter of difficulty and increased expense to widen the cuttings and embankments of the Thull Ghaut incline, after the line was opened for public traffic ; and I am also of opinion that the Ghaut incline should be constructed completely as a double line in the first instance, for the sake not only of ultimate economy, but also of the efficient conveyance of the important traffic between Bombay and Khandeish.

16. The following is my estimate of the increased cost of the extension from Wasindree to Munmar, comprising all the works for a double line, except the earthwork and permanent way ; and it will, I hope, guide you in determining whether or not you will carry into effect the suggestion which I have now submitted to you :—

Earthwork	£215,100
Tunnels, viaducts, bridges, and culverts	217,100
Permanent way, fencing, and level crossings	352,300
Establishment, engineering charges, and contingencies	89,600
Rolling stock, and stations	94,400

Total..... £968,500

17. I have no hesitation in stating, that if the widening of your railway be deferred until it is open for public traffic as a single line, the cost of the alterations will considerably exceed the difference of these two estimates.

18. At Munmar, the end of our previous operations, the line had been carried by favourable gradients, and with light works of an ordinary description, over a very low pass of the Indhyadree range of hills; and from this point the extension of it descends the Valley of the Pazun for about 20 miles, with good working gradients and moderate works, crossing at the 14th mile the direct road from Malligaum to Aurungabad. It then bends eastward, and near the village of Andarree, at the 30th mile, crosses the river Munmar, which is 40 yards wide, with a dry bed of solid rock. From this point it traverses some undulating ground, and entering upon the course of the river Tetoor, passes close to Chaleesgaum, one of the principal cotton marts of Khandeish; and continues, with easy gradients and remarkably light works, along the left bank of that river, past Bangley, to the 59th mile, where it crosses the Tetoor near the village of Wurgaum, at a favourable point, its width there being only 90 yards. The line then bears to the right, in order to avoid the broken ground near the river Girna, and enters upon the course of the river Hewra, near the town of Pachora, at the 70th mile.

19. These eleven miles are unexceptionable, in respect both of gradients and works. From Pachora it descends along the right bank of the Hewra, and at 75½ miles crosses the Bola, about a mile below its junction with the Hewra, and near the village of Dooskeira. This crossing has been laid out at a place which will afford excellent foundations upon strong rock; and although the section shows a considerable width of the bed of the river, the waterway may be safely reduced, in the construction of the viaduct, to about 90 yards. The line thence continues along the right bank of the Girna, passes close to Borenar and Mussawud (places of large traffic during one month every year, on account of the great Khandeish Fair, which is annually held there), and at the 89th mile crosses the Koorunda nulla, which is only 40 yards wide, but presents rather precipitous banks.

20. Keeping westward of the hills, which there rise to the NE. by E., the line still follows the course of the Girna to the town of Pimpralla, where it cuts through the toe of the hills at a low point, and sweeps round to the north of Julgaum. The whole of the line just described, from Pachora to Julgaum, is of a highly favourable character in every respect.

21. This portion of the line from Munmar to Julgaum has been dealt with in the drawings and estimates as a separate section, in order to facilitate the comparison between the Taptee and Thull Ghaut lines, which converge near Julgaum.

22. Upon the whole of this section, which extends for 100 miles through some fertile and healthy districts of the province of Khandeish, there is not a single work of sufficient magnitude to call for remark. The line throughout is of a cheap and very favourable character. Some improvements may, no

doubt, be made before the line is staked out for construction, particularly at the crossing of the river Munmar, and between that point and Chaleesgaum.

23. Tables of the curves and gradients are appended, and it will be seen, on reference to them, that out of the 100 miles there are 72 level and first class gradients, and $73\frac{1}{2}$ miles of straight line. Rock will be found in a few of the cuttings between Munmar and the river Munmar, but onwards as far as Chaleesgaum they will generally consist of marl; and along the plain through which the river Tetoor takes its course the soil is alluvial. Ballast is procurable in any quantity from the Tetoor and Girna, and many of the nullas and smaller rivers contain large beds of sand and gravel.

24. Many roads are crossed along this part of the line, as may be observed upon the plan; but they are for the most part mere village cart-tracks. In numerous instances I have provided for carrying the roads under the railway, by means of small bridges, so that the level crossings will not average more than about one a mile. The principal stations upon it will be at Chaleesgaum, Pachora, and Julgaum. The smaller stations will no doubt ultimately be numerous through this district. At present, however, I can specify only five, namely at Jugunwaree, Jaundurry, Bangley, Wurgaum, and Mussawud.

25. Upon Section No. 2, the extension commences near Julgaum, and runs nearly due east, close by the important town of Nusseerabad, to the river Wangoor, which it crosses at a remarkably favourable spot near the village of Sokagaum. The Wangoor here presents a strong rock bed, in the centre of which stands an island, dividing it into two channels. The extreme width of the crossing is 300 lineal yards. The flood of last year rose 31 feet, and the highest ever known reached 55 feet above the bed of the river. From Sokagaum the line proceeds by the village of Bhosawul, and approaches the Taptee with a curve of half a mile radius. By this means a straight and square crossing of that formidable river is obtained, between the villages of Seedgaum and Dooskeira, at the 119th mile.

26. The whole of the section from Julgaum to this point is of a highly favourable character, except at a crossing of the Wangoor, where a large viaduct will have to be built. An extensive examination was made of the river Taptee before the crossing was selected, and we ascertained that there was no point westward of the Wangoor where, by crossing the Taptee, we might with advantage avoid the necessity for bridging both rivers. The width of the Taptee from bank to bank at ordinary flood level is 590 yards. The flood of last year rose 52 feet, and the highest flood ever known 78 feet, above the bed.

27. Above the crossing which has been laid out, there is a deep pool in the river, extending for about six miles, and terminating with a bar of rocks. Below this the bed is of solid stone, scattered over with boulders, and is nearly dry during the fair weather. The viaduct will be 610 yards long; but although a very costly work, it does not present any practical difficulties, nor is it likely to involve any serious or expensive contingencies, because the foundations are

of a favourable description, and soon after the close of the rains, the still water that would remain in this part of the river might be easily dealt with, and the foundations laid in. I am of opinion that this viaduct should be built in the first instance for a double line, and have estimated its cost accordingly: it ought not to be valued at less than £53,000, and its construction will occupy from three to four years.

28. It is only where the large rivers of Western India are constantly exposed to the tides, and during the monsoon to the land-floods also, and where they contain water within their channels at low tides, even during the most favourable seasons, that to cross them will require bridges of such magnitude and difficulty as to approach the furthest limits of railway works, both in the time and the cost of their execution. From the fact that, near the eastern boundary of Khandeish, the crossing of the Taptee can only be effected by so large a viaduct as that to which I have just alluded, some idea may be formed of the expense and difficulty of bridging it near Surat, at a point about 218 miles below our crossing, and after the river has been charged with the floods that pour down from 200 miles of the Indhyadree Range on the southern and western sides of Khandeish, as well as from 150 miles of the Satpoora Mountains on the north. The highest of these floods have reached 60 feet above the bed of the river at Surat; and, in building a railway viaduct over that part of the Taptee, to contend with them, as well as with the dead-water in the channel, which is 28 feet deep, and the ordinary tides, rising about 11 feet, must, I feel sure, involve practical difficulties and economical objections of the most serious nature and extent. Nor would the expense be confined merely to the crossing of the Taptee channel, for ample waterway would have to be provided, also, for its inundations, which spread for miles over the low country traversed along the coast by the proposed railway.

29. Between the rivers Wangoor and Taptee, the line crosses a district which is only partially cultivated; but from the Taptee to Boorhanpoor, it traverses, for 31 miles, a fertile, level plain, in the rich Talooka of Sowda, presenting every facility that could be desired for the construction of a railway. It crosses the Sookce, Bookree, and Ootowlee, and passes about a mile and a half from the city of Boorhanpoor. These three rivers are small, and the bridges are not worthy of any particular notice.

30. At 153½ miles, near Nimbola, the line crosses, on a level, the Boorhanpoor and Asseerghur road, about five miles from the former, and seven miles from the latter place. Here Section No. 2 terminates, at a distance of 313½ miles from Bombay. The whole of this section, extending for 53½ miles, is of the most favourable character, except the crossings of the two large rivers, the Taptee and Wangoor, which will be so expensive as to raise the estimate, very cheap in other respects, above the average cost of the extension comprised within our season's operations.

31. The curves and gradients, tables of which are hereto appended, are remarkably good: 50 miles are either level or of first class gradients, and

41½ miles are straight. Many village roads are crossed along this fertile part of Khandeish, and have been conveniently dealt with, as before.

Stations will be required at Nusseerabad ; Andulwarce, for Sowda ; Asseerghur road, for Asseerghur ; Boorhanpoor ; Adjunta, for Ravere ; and Yeroda, for Boorhanpoor. Several other small stations will, no doubt, prove to be necessary, as the traffic developes itself.

32. From the neighbourhood of Nusseerabad, on this section, it is my intention to proceed next season with the laying out and survey of an extension of your railway past Bodwur and Mulkapoor, through Berar, near Oomrawuttee, Arvee, and Hingunghat, to Nagpore ; but the exact route, and extent of the line, will of course depend upon the nature of the country, and the amount of accommodation which the traffic of that district may require. Thus, while the main line may serve Khandeish, and, proceeding onwards, open out the rich Valley of the Nerbudda, the trade of which is now almost entirely locked up, and complete a trans-peninsular railway communication between Calcutta and Bombay, we should, by a comparatively short additional extension, and by a direct route, convey the vast produce of Berar to the port of Bombay. This part of Berar having been lately ceded, the whole of the proposed line will be within the British possessions.

33. It might appear to you, that it would have been advisable to carry our main line through Berar by Nagpore, instead of by Asseer, Hurda, and Hooshungabad, into the Nerbudda Valley, and so on to Mirzapore ; but an examination which Mr. Graham has made, of the country between Nagpore and the Nerbudda, has proved that course to be most unfavourable for a line of railway. Moreover, the route which we have taken passes through a populous and well cultivated district, while the other, between Nagpore and the Nerbudda, would cross an almost unbroken jungle. At the close of next season I shall be able to report to you more fully upon this subject.

34. The line comprised in Section No. 3 commences from the Asseerghur and Boorhanpoor road, at 153½ miles, and traversing a plain (smooth for three miles, but beyond that intersected by numerous deep, narrow ravines), reaches the foot of the Satpooras, which it ascends by a series of easy reverse curves. Between the 158th and 162nd miles it crosses four large nullas, which, rising among the hills, flow out as mountain torrents, and, scouring to a great depth into the light soil of the plain, and fed by the minor streams, soon become formidable rivers. Where we cross them, however, the works are inconsiderable, although they are the most extensive upon these nine miles of the section. After crossing the river Pandar, by a bridge about 55 yards long, the line takes a direction a little to the west of north, and about the 167th mile crosses the road from Asseerghur to Sawul, at a distance of six miles from the former place ; and then, climbing the hill for about three miles, bears north-east, and, passing Amudnuggur, reaches the summit of the Satpoora Range at 175½ miles. The height of this summit is inconsiderable, being only 390 feet above the level of the Taptce Valley ; and its ascent is effected in a distance of 12 miles,

without any works that call for observation, and with various gradients, the worst of which is 1 in 100 for a length of about a mile and three quarters. From the summit, the line descends by a gradient of 1 in 118 to the 177th mile, where Section No. 3 terminates.

35. Between Asseerghur and the summit, the line passes over the trap formation; but the rock appears upon the surface only in a few places, and the earthwork will not be of an expensive character. Stone suitable for building, teak, and ballast, are procurable in abundance for the works along these 23 miles. There are very few level crossings, and only one small station, at the Asseerghur and Sawul road, will be required.

36. Tables of the curves and gradients are appended. They are both of a good working character, one-half of the section being either level, or of first class gradients, and straight; and when it is considered that the Satpooras, one of the most formidable ranges upon this side of India, are surmounted by them, they are far more favourable than I expected it would be possible for us to obtain.

37. Some improvements may probably be made hereafter in this portion of the line, but they will not be of such importance as to affect my estimates, or to alter materially the general character of the section.

38. The next section of the line, No. 4, extends from the 177th mile, near the Asseer summit of the Satpooras, to Charwar, in the Valley of the Nerbudda, 230½ miles; but no plan of it has been made, for the reasons which I have already assigned. Its course is by Ruttyghur, far to the east of Mandwa, and in a direction parallel to the river Suktha, and at a considerable distance from its right bank. It crosses the road from Peepleod at the 182nd mile, the road from Bhamghur to Goondwana in the 192nd, and the rivers Gungapot and Ogguny at the 202nd and 204th miles, with small viaducts. From the Ogguny it rises by a gradient of 1 in 132 for three miles and a quarter, and then descends by the same gradient for two miles to most favourable ground, along which it runs to Charwar for a distance of 20 miles, without encountering any works that call for notice.

39. From Boorhanpoor to Charwar, the line passes through a thickly wooded country. It is the direct route, but lies to the east of the present course of the traffic from Hurda, which there follows a circuitous road by Jawar, Kurdwa, Boregaum, Asseer, and Boorhanpoor, because along that route there are more halting-places; but Captain Keatinge, the Political Agent in Nimar, has already had a survey made of a road by Peepleod and Jawul, so that the course followed by the line will there meet the requirements of the traffic. The soil along this section is composed of that indurated trap, mixture of sand, perished stone, and clay, which is here known by the name of moorum, and is very favourable for our excavation. The works upon it are of a light description, and the gradients, of which a table is appended, are good; and the direction of the line is very favourable. Some improvements may, perhaps, be effected in it when the line is laid out for construction; and, in

particular, I may mention that the summit which I have described at the 206th mile may, I believe, be altogether avoided.

40. Observing from the Returns of Sir Robert Hamilton, Baronet, Resident of Indore, and Captain Keatinge, that there is a decided set of the trade and passenger traffic from Hurda and the Nerbudda Valley towards Indore, and with a view of approaching the rich iron mines of Chandghur and Poonassa, a trial branch line has been laid out, and the section of it taken from Hurda to Poornee, as shown by the blue line upon the accompanying general map of the Nerbudda Valley. Should it be decided to extend your railway through Nimar to Indore and Agra or Delhi, it would be a question whether the line from Asseer summit might not be carried further to the west, along the course of the river Suktha, as in that case the Bombay and Calcutta and the Bombay and Agra lines would diverge near Poornee, and the trial section which has been taken would form a portion of the line to Mirzapore.

41. The stations upon this section will be at Charwar and Hurda.

42. Section No. 5 commences near Charwar, at a distance of 231 miles from Munmar, and 391 miles from Bombay, and extends up the Nerbudda Valley to the Towa, one of its tributaries, at the 303rd mile. No survey has been made of this line as far as Charkeira; but it has been accurately laid out upon the ground, and a reference to the section will show that it presents favourable features in every respect.

43. From Charkeira the line runs to the north of Timboornee, and at the 266th mile crosses the river Gunjal, which is 190 yards wide, and its floods rise to a height of 40 feet. From this point, it continues of an equally favourable character for 12 miles, where it passes the very busy and prosperous town of Sewnee. It thence keeps along the flat and easy ground of the Nerbudda, and, passing about eight miles to the east of Hooshungabad, reaches the river Towa at the 303rd mile, which is the termination of this section.

44. Nothing could be more favourable in every respect than the whole of this section, 72 miles in length. The only work upon it is the crossing of the Gunjal, which is of moderate extent, and very much resembles the river crossings upon our experimental line, between Callian and Wasindree. Nearly the whole of it is straight, and the gradients are unexceptionable; the country it traverses is productive, populous, and active;—nothing, in fact, could exceed the advantages of the district from Hurda to the Towa. It is a fine level plain, presenting every facility for the construction of a railway, and covered in all directions with rich, abundant crops, fine trees, and prosperous villages; and a reference to the plan will show how many communications already exist upon it. These roads have been carried under the railway in many instances, and the level crossings thus reduced to a moderate number. The stations upon this section will probably be as follows—at Timboornee; Sewnee; Dokarra, for Hooshungabad; Charkeira; and Kotra.

45. Section No. 6 commences on the left bank of the river Towa, at the 304th mile from Munmar, and extends to Katiotia, at the 392nd mile. The

Towa is very nearly dry during the fair season, but in the rains its shallow though very wide course is flooded for a width of 1,276 yards from bank to bank. The floods, however, have seldom been known to rise above its lower or eastern bank, and I therefore believe that its channel might very safely be contracted to a considerable extent. The bed of this flood stream is a mass of loose sand for a depth of about 12 feet, when it becomes firm, and suitable for either piling or masonry foundations; but in the present instance I have estimated this viaduct of simple timber piling and gearing wide enough for a single line of rails, and extending along the whole channel of the river. The course of this river has been carefully examined from Hooshungabad to Kaisla, near the hills, where it issues at even a greater width than at our crossing; and no place has been found more favourable than the spot best suited for the direction of the railway. Under any circumstances, therefore, it must prove an expensive work; but beyond that, there is no feature in it which is at all calculated to affect the eligibility of the line.

46. From the Towa, the line extends for nine miles over a level plain, and entering upon some undulating, easy country, near the 314th mile, proceeds in almost a straight line, and without a single objectionable feature, to the 358th mile, where it crosses the river Doodhyc at the village of Joonhetti, with a viaduct of ordinary dimensions. From the crossing of this river, the line runs quite free from works along the surface of the country for 14 miles, where it approaches the town of Garrilwara. It there has to cross the river Sukur by a viaduct 170 yards long. From the river Sukur it becomes a practically straight surface line over a level country, as far as the 392nd mile, where it crosses the road to Katiotia, the termination of Section No. 6. By the tables of the curves and gradients it appears that 73 miles out of 87 are either level, or of first class gradients, and that 65 miles are straight.

47. The materials for earthwork upon this section will be the alluvial soil of the valley: stone and lime for building purposes are procurable, generally, from the hills at a short distance to the south of the line. Teak of large scantling, and other good woods, abound in the Shahpoor jungles, about 30 miles from the railway, along the Towa; and timber and other materials can be conveyed down the Nerbudda early in the season. This portion of the line passes about nine miles from Mowpani, at the out-crop of the Benar coal, of which there appears to be abundance in that district. It may, perhaps, be practicable to pass somewhat nearer to it; but from our last season's operations it did not seem advisable to lengthen the line by running closer for that purpose, because we should then have to encounter the Seta river, which has scoured out a deep and broad channel in the plain, and its course as far as its junction with the Sukur, near Garrilwara, which would have to be followed by the railway, is very tortuous. We have as yet made no survey for the purpose of ascertaining the extent and quality of the seams of coal. I recommend, however, that this should be done before the engineers leave that part of the country. Near Mowpani two seams of coal have been superficially

opened out last season, but no shaft has been sunk, nor has any attempt been made to work the coal up to this time, although it has been frequently picked up in various places, and favourably reported upon. The stations upon it will probably be at Sohagpoor, Garrilwara, Babye, Seemry, Hutwas, Bunkerry, Kaisla, and Sehora.

48. Section No. 7 commences near Katiotia, at the 392nd mile, and crosses the river Baroorewa, about 60 yards wide, in the 394th mile, with much broken ground on either side. At the 395th mile it crosses on a level the Hooshungabad and Jubbulpore main road, and then passes close to Nursingpoor, the well-known and important mart for the cotton and grain of this part of the country. After passing a small stream, called the Singery, and recrossing the Hooshungabad and Jubbulpore road in the 397th mile, the line continues of the most favourable character until it approaches within a mile of the Shair, where the ground is cut up by deep ravines. That river is crossed at the 404th mile, where its width is 190 yards. Its banks are precipitous, and the extreme height of the flood has been known to reach 60 feet above the bed, although its ordinary level is about 40 feet. From this point the railway runs generally upon the surface of a very even tract of country, as far as the 424th mile, and presents nothing worthy of remark, except the crossings of two or three streams with sandy beds, and soft crumbling banks. It then approaches the Nerbudda, and traverses some broken ground, much intersected by nullas. At the crossing of the Nerbudda, its banks are very high and precipitous, especially on the north side. The total width from bank to bank is 414 lineal yards. The flood of last year, the highest on record, rose 90 feet above the river bed, but subsided in an hour or two: the ordinary floods rise 74 feet. During the dry season, however, building operations may be carried on with facility, as the river contains very little water; and early in May, when our section was taken, the extent of dead-water in it was only 71 yards wide, and its greatest depth only 5 feet.

49. The course of the Nerbudda was examined for 30 miles, from Sukur, at the junction of the Huran, on the western side of the railway, to Beira Ghaut, on the east. Near the Beira Ghaut the channel is much contracted, and runs through perpendicular rocks of white marble. The facilities which this circumstance would appear to offer could not be taken practical advantage of, because, during the floods, the Nerbudda not only rises high above those rocks, but, before entering the gorge, finds for itself another wide channel, through soft soil; and, added to this, a more serious objection was found to exist in the almost insurmountable difficulties of the country between Chindwara and the Beira Ghaut.

50. The crossing of the Nerbudda which we have selected is near Jhansee Ghaut, to the west of the ford of the Jubbulpore road. The viaduct will be 371 yards long, and I estimate the cost of it for a double line of rails at £40,000. The bed of the river is rock, and I see no reason to expect that any important engineering difficulties or expensive contingencies will be met

with in the execution of this large work. It is advisable, while the dimensions and probable cost of our crossing of the Nerbudda are under consideration, to draw your attention to that other crossing of it which has been contemplated, near Broach. The spot which we have selected for bridging it is upwards of 500 miles above the town of Broach; and along nearly the whole of that great distance the Nerbudda receives the immense drainage of the Vindhya and Satpoora ranges of mountains, for which a continuous waterway several miles in length must be provided. Moreover, at the proposed crossing, not only will the floods require an extent of bridging for which railway engineering practice affords no precedent, but the execution of the work within the channel of the river will be encumbered with difficulties and expense by the large body of water, 28 feet deep, which it contains even at the lowest tides; by the ordinary tide, which rises 10 feet, and is of unusual velocity near Broach; and by the enormous inundations, which rise about 70 feet above the bed of the river, and spread for miles over the country in one vast sheet of water, sometimes as much as 10 feet deep. Whether the proposed crossing of the Nerbudda at Broach be judged of by analogy with ours near Jubbulpore, or whether the drainage of two ranges of mountains for nearly 500 miles be taken as the measure of the work, its proportions must be extreme. The character of this most formidable projected work bears indirectly upon your interests, and cannot fail to affect in a most important degree the railway question now under the consideration of Government. I therefore request that I may be commissioned to report to you, without delay, upon the subject of the proposed railway crossings of the river Taptee at Surat, and of the Nerbudda at Broach, and to take the necessary steps for doing so in full detail.

51. After crossing the Nerbudda at the 426th mile, the line traverses some rough ground, and several nullas, for about a mile and a half, then runs for 20 miles upon the surface of a level and even country, and at 447½ miles reaches the Jubbulpore and Saugor road, at a distance of a mile and a half from Jubbulpore, where that part of the line upon which I now have the honour to report to you terminates.

52. The whole of the last 55 miles are of a favourable character in every respect; and if it were not for the crossings of the rivers Nerbudda and Shair, the cost of it would reach the very lowest limit. The soil is alluvial; the requisite materials are abundant; and the level crossings are few. The tables of curves and gradients show 47 miles of practically level gradient, and 46 miles of straight. The stations through this district will probably be at Nursingpoor, Jubbulpore, Peindry, Chindwara, and Kisrode.

53. Our field operations last season extended to Gosulpoor, a distance of 18 miles from Jubbulpore; but I shall make no further allusion to that part of the line in this Report, because it is liable to alteration when the ascent of the Vindhya is laid out.

54. Reviewing the whole of the North-eastern Extension, from the top of the Thull Ghaut to Jubbulpore, a distance of 522 miles, the character of our line

is unexceptionable, and its construction ought to be very cheap: the materials are good and abundant; the price of labour is low; and there are no engineering difficulties to be encountered upon it. The only considerable works are comprised in the following brief list:—

One tunnel, 387 yards long, which may be avoided.			
The Godavery viaduct, 120 yards long.			
The Wangoor	ditto,	300	ditto.
The Taptee	ditto,	610	ditto.
The Gunjal	ditto,	210	ditto.
The Towa	ditto,	1,276	ditto.
The Doodhye	ditto,	170	ditto.
The Sukur	ditto,	174	ditto.
The Shair	ditto,	213	ditto.
The Nerbudda	ditto,	371	ditto.

55. The Indhyadree and Satpoora ranges, which were supposed to present such formidable obstacles to laying out a railway, are proved by our sections to be capable of being surmounted by a good working line, free from heavy works of any kind. Nearly its entire course traverses some of the most fertile and productive districts upon this side of India; for, after clearing the Ghauts, it runs through the plain of the Godavery for 50 miles; crossing the Indhyadree range, it enters Khandeish, and passes through that province for 150 miles, accommodating some of its most healthy and productive Talookas, and its principal cotton marts; then, passing the Satpooras, it ascends for 250 miles the magnificent Valley of the Nerbudda, with its valuable coal and iron-fields, and its copious supply of grain, seeds, and cotton: and while it presents these commercial advantages, and affords this vast extent of local accommodation, it pursues a direct course for effecting the trans-peninsular communication with Calcutta, and for connecting the province of Berar with the port of Bombay.

56. Sufficient returns of traffic have already been made to prove that a profitable revenue will accrue to your railway between Bombay and Eastern Khandeish; and beyond that, it could hardly be expected that the amount of existing trade would be found sufficient to establish actual data for an equally profitable return: but there is throughout the Valley of the Nerbudda so great an abundance of marketable and exportable produce, which only awaits the opening of a quick and cheap communication to meet the demands both in this country and for export, that I believe no doubt can be entertained of the commercial success of that part of your undertaking, particularly when we regard the importance and extent of the commerce that must pass between Bombay and Calcutta, and the great facilities of the country for the construction of a railway.

57. In many parts of the Nerbudda Valley coal exists, of undoubted quality, in great abundance, and lying in a most favourable position for being

worked. Iron ore, too, abounds, especially on the north of the Nerbudda. The principal mines of the district are Tendukheira, about 10 miles from our line, near Nursingpoor. They are now worked in the rudest fashion, but the iron produced is of excellent quality. There are furnaces also at Paneghur and Gosulpoor, close to which our line passes; and although the iron is held inferior to that of Tendukheira, it is, I believe, good, and forms an article of export from those towns. Valuable iron mines also exist at Poonassa and Chandghur, and I find, from papers kindly furnished by Captain Erskine, Commissioner of the Saugor and Nerbudda Territories, that besides those which I have specified as the principal ones, and as lying near the course of our line, there are five mines within 20 miles of Jubbulpore.

58. I am not yet sufficiently informed to furnish you with a full statement of the present general traffic of the Nerbudda Valley; but I beg to append two returns from Captain Keatinge, Political Assistant in Nimar, one of which was kindly furnished to us by himself, and the other by Sir Robert Hamilton, through the Bombay Government. By these it appears that the quantity of goods sold in four bazars, and which passed four points in Nimar in the year 1853, amounted to 12,417 tons, of which the trade to Bombay is entirely the growth of five years, and is increasing rapidly.

59. The traffic on the Agra and Bombay road, taken at Akbarpoor for twelve months, from April 1853, was as follows:—

Foot passengers	95,750
Bullocks and horses	21,229
Carts	18,087
Camels	2,445
Elephants	46
Buffaloes	938
Asses	293
Palanquins	121
Sheep and goats	964
Carriages	26

60. The return of traffic on the Boorhanpoor and Indore road, taken at Kherry Ghaut for twelve months, from April 1853 to May 1854, gives—

Foot passengers	26,141
Palanquins	17
Sheep and goats.....	102

As well as the goods comprised in Captain Keatinge's statement of the Nimar traffic.

61. In addition to these, we are indebted to Mr. Williams, Overseer of the School of Industry at Jubbulpore, for the following statement of the annual trade to and from that station; and from his long residence there, and his knowledge of the commerce of the country, it may, I am sure, be safely relied upon:—

Cotton	8,571 tons:
Wheat	4,285 „
Hemp, gum, ghee, iron, and other commodities	1,585 „
Hides	100,000 Nos.
Imports, about	11,553 tons.

62. Making a total of upwards of 26,000 tons for the present trade of Jubbulpore.

63. In transcribing the results of these returns, I by no means intend to imply that this traffic properly belongs to our line between Bombay and Jubbulpore; but my purpose is to show, by reference to its present trade, that the district of the Nerbudda is likely to afford us a very large traffic. No statistical returns could present a correct estimate of the traffic that would be created if the Nerbudda Valley possessed a railway communication with the ports of Calcutta and Bombay. It is now practically shut up; but the exports of coal, iron, cotton, wheat, hemp, linseed, timber, and other products, and the imports of salt and manufactured goods, must eventually become immense.

64. The following is my estimate of the extension from Munmar to Jubbulpore, to which, for the sake of convenient reference, I have added the estimated cost of the line from Wasindree to Munmar, both having been framed in accordance with the orders of the Honorable Court of Directors:—

NORTH-EASTERN EXTENSION.

Abstract Estimate of a Single Line from Wasindree to Jubbulpore, in accordance with the Orders of the Honorable Court of Directors.

Nos. of Sections.	Titles of Sections.	Mileage.	Earthwork.	Tunnels, Viaducts, Bridges, and Culverts.	Permanent Way, Fencing, Level Crossings, &c.	Establishment. Engineering Charges, and Contingencies.	Rolling Stock, and Stations.	Total.	Average Cost per Mile.
			£	£	£	£	£	£	£
	From Wasindree to Munnar	109	187,900	217,100	332,200	82,300	94,400	913,900	8,384
1	From Munnar to Julgaum.	100	60,200	52,100	332,400	44,500	70,000	559,200	5,592
2	From Julgaum to Nimbola	53½	23,700	86,900	177,900	28,800	41,700	359,000	6,710
3	From Nimbola to Asseer.	23½	15,300	24,900	78,700	11,900	13,300	144,100	6,132
4	From Asseer to Charwar.	53½	27,900	28,800	169,900	22,700	34,900	284,200	5,312
5	From Charwar to the river Towa..	73½	26,300	50,800	256,500	33,400	52,000	419,000	5,672
6	From the river Towa to Katiotia. . .	87½	30,000	66,600	311,700	40,800	59,400	508,500	5,803
7	From Katiotia to Jubbulpore	55½	22,700	78,200	192,200	29,300	40,300	362,700	6,535
	Total	556½	394,000	605,400	1,851,500	293,700	406,000	3,550,600	6,380

65. The following is the estimate of the whole extension from Wasindree to Jubulpore, as it would stand if my suggestion for the construction of a complete double line at the Thull Ghaut incline were adopted:—

NORTH-EASTERN EXTENSION.

Abstract Estimate of a Single Line from Wasindree to Jubulpore, with a provision for a complete Double Line at the Thull Ghaut Incline.

Nos. of Sections.	Titles of Sections.	Mileage.	Earthwork.	Tunnels, Viaducts, Bridges, and Culverts.	Permanent Way, Fencing, Level Crossings, &c.	Establishment, Engineering Charges, and Contingencies.	Rolling Stock, and Stations.	Total.	Average Cost per Mile.
1	From Wasindree to Munmar	109	£ 215,100	£ 217,100	£ 352,300	£ 89,600	£ 94,400	£ 968,500	£ 8,885
2	From Munmar to Julgaum	100	60,200	52,100	332,400	44,500	70,000	559,200	5,592
3	From Julgaum to Nimbola	53½	23,700	86,900	177,900	28,800	41,700	359,000	6,710
4	From Nimbola to Asseer	23½	15,300	24,900	78,700	11,900	13,300	144,100	6,132
5	From Asseer to Charwar	53½	27,900	28,800	169,900	22,700	34,900	284,200	5,312
6	From Charwar to the river Towa . .	73½	26,300	50,800	256,500	33,400	52,000	419,000	5,672
7	From the river Towa to Katiotia . .	87½	30,000	66,600	311,700	40,800	59,400	508,500	5,803
8	From Katiotia to Jubulpore	55½	22,700	78,200	192,200	29,300	40,300	362,700	6,535
	Total	556½	421,200	605,400	1,871,600	301,000	406,000	3,605,200	6,478

66. These estimates have been framed upon my experience in the construction of our works, and upon accurate data, obtained by Mr. Graham, respecting the local prices, and facilities of those districts through which this extension would pass. The prices of iron have been fixed at the high rates which we paid for our last supplies; and as the market has since risen, it may possibly happen that my estimates of the permanent way may fall short in that particular. My rates, however, are above the average, and the future turn of the market may therefore be in our favour. In any event, I beg to protect my estimates from this speculative contingency.

67. The cost of a single line of permanent way upon the several sections of this extension varies from £2,810 to £3,160 per mile, which is more than one-half of the total mileage cost of each section. As this large proportion arises chiefly from the high prices of the English iron materials, and from the great expense of conveying them from the port to the interior of the country, the expediency and advantage of establishing the means of providing a local supply of rails, chairs, spikes, &c. are clearly pointed out. Although great encouragement for the early establishment of ironworks exists in the valuable character of the mines, in the great and urgent demand for iron in this country, and in the fact that the high prices of English permanent way materials will be a serious and undue impediment to the cheap construction of railways through the interior of India, yet it is very doubtful whether the Nerbudda coal and iron-fields can be worked so expeditiously and economically as to afford us much benefit in the construction of the railway between Bombay and Khandeish. In fact, I am inclined to think that active and successful operations in that enterprise will be found to depend more upon the completion of a railway communication between Bombay and the Nerbudda Valley than the railway does upon a local supply of coal and iron.

68. I now proceed to lay before you some observations upon the comparative merits of the Taptee and the Thull Ghaut lines between Bombay and Julgaum, the point in Khandeish at which they would converge. It is my duty to do so, not only for the purpose of clearly demonstrating the advantages of your railway in the comparison which is about to be instituted between it and the alternative line which has been projected, but for the justification of the selection which I have made of the Thull Ghaut as the best route, in an engineering point of view, from Bombay to Khandeish, and, commercially, the most profitable that the country affords between those places.

69. The important points upon which the comparison should be instituted are,—

1st.—The length of line, and time of transit.

2nd.—The cost of construction.

3rd.—The time required for construction.

4th.—The cost of working.

5th.—Traffic fares, and gross receipts.

6th.—The annual return upon the outlay.

70. Alternative lines have been projected;—one leaving Bombay by an independent route, and traversing the western side of the islands of Bombay and Salsette, crossing the Sion Creek at Mahim, and the arm of the sea near Ghora Bunder; thence proceeding up the Konkan to Surat, and from Surat up the river Taptee to Julgaum. The comparative distances from Bombay to Julgaum will be as follows:—

Bombay and Taptee line	380 miles.
Thull Ghaut line	259 „

In favour of the Thull Ghaut line 121 miles.

71. The comparative lengths of new railway to be constructed will be,—

Bombay and Taptee line	380 miles.
Thull Ghaut line	209 „

In favour of the Thull Ghaut line 171 miles.

72. The proposed crossing of the sea at Ghora Bunder would in itself prove a fatal objection, on account of the difficulties and expense of its construction, if not from its actual impracticability. I have not had an opportunity of surveying the proposed crossing, but have ascertained that there is a deep body of water, at least a mile wide, in the channel at low tide; the water rises during the monsoon, at spring tides, about 17 feet, above which a clear waterway of 30 feet would have to be provided for the navigation; and it would therefore be necessary to build a viaduct, in the centre about 70 feet above the bed of the channel. Although tolerably well acquainted with the Bassein river, I would not venture to affirm that this work would be found to be beyond the capabilities of engineering, but it must undoubtedly exceed the reasonable limits of economy for Indian railways.

73. In paragraph 40 of His Lordship's Minute of the 20th of April 1853, the Governor General has stated that the portion of the Great Indian Peninsula Railway from Bombay to Tanna must be common to any line entering the island of Bombay, whatever may be its direction.

74. For these reasons it will, I think, be unnecessary for me to pursue any further the comparison between the Thull Ghaut line and this part of the projected alternative line.

75. The second line has been projected to strike off from the Great Indian Peninsula Railway, a little to the west of Callian, and to join the other line near Vujerabye, at which point the alternative lines unite, and one course only is thence pursued to Julgaum in Khandeish.

76. The comparative distances from Bombay to Julgaum will be as follows:

Callian and Taptee line	390 miles.
Thull Ghaut line	259 „

In favour of the Thull Ghaut line 131 miles.

The comparative lengths of new railway to be constructed will be,—

Callian and Taptee line.....	358 miles.
Thull Ghaut line .*.	209 „

In favour of the Thull Ghaut line..... 149 miles.

77. With reference to the time of transit upon the Ghaut line, it is an important fact, ascertained by the returns, that by far the greater portion of the traffic will have to be carried from the interior to the port of Bombay; and that therefore the steep gradient at the Ghaut incline, and the gradient of 1 in 100 between it and Wasindree, will expedite rather than delay the conveyance of goods in that direction.

78. The average speeds, including stoppages, that were maintained on the London and Birmingham Railway, in the year 1845, were 24 miles an hour for passengers, and 18 miles an hour for goods trains; but looking to the development of the resources of this country by means of cheap railway communication, I am of opinion that those rates would exceed the limits of economy, and shall therefore take the highest effective rates of speed that ought to be maintained upon Indian railways for many years to come at 22 miles an hour for passengers, and 15 miles an hour for goods trains, including stoppages. Applying these rates to the transit from Julgaum to Bombay along the Taptee line (390 miles), the duration of the journey would be, for passengers $17\frac{1}{2}$ hours, and for goods 26 hours; and taking the same speeds also for the Ghaut line (259 miles) in that direction, and a delay of 15 minutes at the Ghaut for passengers, and half an hour for goods trains, the duration of the journey would be, for passengers $12\frac{1}{2}$ hours, and for goods $17\frac{1}{2}$ hours. Thus there would be a saving upon the Ghaut line of $5\frac{1}{2}$ hours for passenger trains, and $8\frac{1}{2}$ for goods, in the journey from Khandeish to Bombay. But the comparison must also be drawn between the two lines for the traffic to be conveyed upwards from Bombay to Khandeish.

79. The 28 miles of our line between Wasindree and the foot of the Ghaut incline, upon which there is a gradient of 1 in 100, rising for $18\frac{1}{2}$ miles, and falling for 3 miles, would no doubt admit of our maintaining the same speeds as upon the rest of the line, by increasing the working expenses; but as I consider economy of working to be of far more importance, both to the public traffic and to railway companies in India, than a little extra despatch, I have taken a reduced speed of 12 miles an hour for our goods trains, and 18 miles an hour for passengers. At the Ghaut incline, I have calculated upon an average speed of 8 miles an hour for goods, and 10 miles for passengers, with stoppages of 15 minutes. The rest of our line from Bombay to Wasindree is, so far as speed is concerned, practically level, and I assume 15 and 22 miles an hour for the speed of the goods and passenger trains respectively. At these rates of speed over the several sections of the Ghaut line, the conveyance of goods from Bombay to Julgaum would be effected as follows:—

	H.	M.
From Bombay to Wasindree, 50 miles, at 15 miles an hour	3	20
Wasindree to Kussara, 28 miles, at 12 miles an hour	2	20
The Thull Ghaut incline, $6\frac{1}{2}$ miles, at 8 miles an hour, with a stoppage of 20 minutes	1	11
Egutpoora to Julgaum, 174 miles, at 15 miles an hour	11	36
Total..	18	27

80. The journey, therefore, by the Ghaut line, as compared with that by the Taptee line, which has been taken at the highest speed of 15 miles an hour throughout, would save more than $7\frac{1}{2}$ hours in the conveyance of goods from Bombay to Khandeish.

81. The despatch of the passenger trains in that direction would be rather less in our favour, because the delay at the Ghaut incline would involve a comparatively greater loss of time. The journey would be effected as follows:—

	H.	M.
Bombay to Wasindree, 50 miles, at 22 miles an hour	2	17
Wasindree to Kussara, 28 miles, at 18 miles an hour	1	34
The Thull Ghaut incline, $6\frac{1}{2}$ miles, at 10 miles an hour, with a stoppage of 15 minutes	0	55
Egutpoora to Julgaum, 174 miles, at 22 miles an hour	7	55
Total....	12	41

82. The journey by the Taptee line, performed throughout at the best speed of 22 miles an hour, would occupy $17\frac{1}{2}$ hours, so that there would be a saving of full 5 hours for passenger trains by the Ghaut line from Bombay to Khandeish.

83. It may be urged by the advocates of the Taptee line, that they would convey the traffic at higher speeds; but that would involve an increase of the working expenses; and the relative cost and receipts of their railway, as compared with ours, would not enable them, with due regard to profitable working, to afford the public such high speed as we could do upon the Ghaut line.

84. The next point of comparison is the cost of construction; and in dealing with it, I have taken the orders of the Honorable Court of Directors as the rule for both estimates, except of the Ghaut, which I have valued for a double line.

85. The cost of thus completing the Thull Ghaut line would, as I have estimated in paragraph 97, amount to £1,527,700.

86. In order to arrive at an approximate estimate of the Taptee line from Callian to Julgaum, for the purpose of comparison, I shall first refer to those portions of the works which are common to both lines, and value them at the same rates, so far as they apply.

87. The permanent way, estimated for 65lb. rails, and on precisely the

same terms as our line, exclusive of the Thull Ghaut incline (which is more expensive), and with a fair reduction in the conveyance of materials, on account of the water carriage to Surat, would amount to £2,930 per mile. The fences, valued at our prices, would be £374 per mile.

88. The rolling stock and stations, estimated at the same rates, exclusive of the Ghaut incline, would cost £750 per mile; and this, it should be noted, excludes all the heavy terminal charges which have been already incurred.

89. The cost of general establishment, engineering, and contingencies, I have taken upon our line at £500 per mile.

90. The above items amount to £4,554 per mile; and this sum could not be reduced, in the estimate of the Taptee line, without a corresponding reduction being made in that of the Ghaut line.

91. It now remains to estimate the earthwork, tunnels, viaducts, bridges, culverts, diversions of roads and streams, and level crossings, upon a line which crosses the whole of the flooded rivers that flow from the Sahyadree Range, along the Konkun, to the sea, between Callian and Surat, and from the Indhyadree Range, through Khandeish, to the Taptee.

92. Not having a section of that line, I shall, of course, not attempt to offer an exact estimate of these works; but if I assume, for the purpose of comparison, that the cost of the earthwork, tunnels, viaducts, bridges, and level crossings, upon a railway with flat gradients from Callian to Surat, and up the Taptee to Julgaum, would at least be equal to that of similar works upon our extension from Callian to Wasindree, I do not think that the moderation of the estimate will be called in question, or that it can be considered otherwise than favourable to that line.

93. The contract schedules for those works between Callian and Wasindree, partly reduced for a single line, in conformity with the order of the Honorable Court of Directors, amount to £2,783 per mile; which, added to £4,554, the estimated cost of the other works, will make a total of £7,337 for the mileage rate of the Taptee line.

94. If credit be taken for a reduction in the first cost of the Taptee line, on account of a cheaper supply of iron materials for the permanent way, and other purposes, from Indian ironworks, than can now be exported from England, I claim for our line that it would derive greater economy from that advantage, if it should be found practicable, because the mileage conveyance of those materials, from the place of their manufacture in the interior of the country, would be less upon the Ghaut than upon the Taptee line.

95. From the extreme unhealthiness of a long district through which the Taptee line would have to pass, a sufficient quantity of labour for its construction would be difficult to be procured, and would, no doubt, be dearer; but I shall regard this peculiar characteristic of that route as affecting the time, and not the cost, of the execution of the works upon it.

96. For the sake of comparison, I shall therefore assume the cost of the proposed Taptee line at the low rate of £7,337 per mile; but I beg that I may

not be understood to convey thereby the opinion that it could be constructed for that sum; for, on the contrary, I consider that would be found much too low.

97. Comparative estimate of cost of construction,—

<i>Taptee Line</i> ,—358 miles, at £7,337 per mile	£2,626,646
<i>Thull Ghaut Line</i> ,—from Wasindree to Julgaum, 209 miles, with a complete double line upon the Ghaut incline	1,527,700
	<hr/>

In favour of the Thull Ghaut Line £1,098,946

98. This difference in the cost of construction is very great; but when we consider that 149 miles more railway would have to be constructed by the adoption of the Taptee line than by the extension of the Ghaut line, and when we value that extra length by the mileage cost of the Taptee line, the amount alone reaches £1,093,213, and very nearly accounts for the whole estimated difference.

99. It must also be borne in mind that these estimates are, in part, only for a single line of railway; and that when a double line were completed, which in all probability would soon be requisite for the traffic, the difference between them would be greatly increased, because the mileage cost would be increased, and the excess in the estimate of the Taptee over that of the Ghaut line arises from its greater length.

100. The time required for construction would chiefly depend upon the magnitude of particular works, and upon the aggregate quantity of work upon each line: a comparison of the sections of the Taptee and the Ghaut lines will determine which contains the largest works, to rule the time of completion.

101. The aggregate quantity of work may be judged of by the estimate, and there can be little doubt that the completion of the Taptee line would be long retarded by the great unhealthiness of the country in the Khandeish district of Nowapoor, where the working season of the year would be of very short duration, and labour difficult to be procured. As a practical Engineer, I should be loath to attach too much importance to difficulties of this nature; but I cannot overlook the fact that, during last season, it was my duty to report to you a falling off in the progress of our works, in consequence of the labourers having been driven to desert them by sickness, and this not in a country considered usually unhealthy. We have the evidence contained in the Report of the 29th March 1852, by Captain Wingate, one of the latest professional labourers in the province of Khandeish, to prove the extreme unhealthiness of the Nowapoor district. That Officer writes of it, among others, as follows:—

“Large tracts of Sultanpoor, and the Nowapoor Mahalkuree’s division, as well as other parts of the Pimpulneir Talooka, are in the same state. The climate of all these parts is reported to be most unhealthy. The Native inhabitants suffer annually from fever and ague, and from enlarged spleen. To those who are not Natives, the climate is still more deleterious; and it would

be almost certain death to a European to remain for any considerable time in the jungles between September and February. They become less unhealthy as the hot season advances, but are never quite safe for Europeans, or even for Natives unaccustomed to the climate. These tracts are, of course, very thinly peopled.

"Large continuous tracts of jungle in the Talookas north of the Taptee, towards the Satpoora Range, and also in the western Talookas south of the Taptee, among the hills bordering the Dangs, have a most unhealthy climate, and are either uninhabited, or contain a spare population, chiefly of Bheels, who have not yet learned habits of steady industry.

"The survey could only be carried on during a few months of the hot season, on account of the unhealthiness of the climate at other times, and it would necessarily be very expensive."

102. This evidence proves the unhealthiness of some portion of the country traversed by the Taptee line; and we may judge from our own experience on Contract No. 4, during the last hot season, what the effects of sickness would be in retarding the works. We know that very little progress could be made during the four months of rain; and as a district of many miles would be closed against labourers, also, from September to February, the works could be actually carried on for a season of only four months in the year. It is of course impossible to speak with certainty as to the time of construction; but from the circumstances to which I have referred, I am of opinion that the completion of the Taptee line would occupy at least two years longer than the Ghaut line.

103. In comparing the working expenses of the Thull Ghaut and the Taptee lines, the fact of the steep falling gradients of the Ghaut lying in that direction in which the greater portion of the heavy traffic will have to be conveyed lessens, to a great extent, the objections that otherwise might be taken to them; and experience alone can prove whether they are not really of practical advantage for working the downward traffic. At any rate, we are fairly justified in considering the Ghaut line quite as cheap as the Valley line, for the conveyance of traffic downwards from Khandeish to Bombay; and it will, therefore, only be necessary for me to enter into details as to the working out of the two lines in the upward direction.

104. Of the items comprised in the working expenses, the locomotive power, the coaching expenses, and depreciation of stock, must be much higher than they are in England; and, in addition to this increase, there will be the disadvantage of having to convey a great number of empty waggons from Bombay to Khandeish, in consequence of a large balance of the goods traffic setting in the other direction.

105. Taking these facts into consideration, and founding my valuation upon the returns of traffic along the north-eastern line, as quoted in my Report of September 1852, I estimate the working expenses, including the Thull Ghaut incline, at £600 per mile per annum; which is corroborated by

Mr. Robert Stephenson's opinion. At this mileage rate, the annual expense of working our line (259 miles long) would be £155,400. I have fully estimated the cost of working the Ghaut incline, and it amounts to £12,000 above the ordinary working charges. The extra annual cost of working the 28 miles between Wasindree and the foot of the Ghaut will be fully stated at £75 a mile, or say £2,100. If these two sums, amounting together to £14,100, be taken from the gross expenses of our line, the ordinary mileage cost will be £545.

106. No extra allowance ought properly to have been made for working the 28 miles between Wasindree and Kussara, because I have already, for the purpose of economy, attributed to it the disadvantage of a reduced speed of conveyance. There is also a further reason,—that the gradients of this portion of the line may be improved when it is again laid out.

107. The mileage cost of working the Ghaut line, with the deduction of the extra charges upon the steep incline, and the approach to it along the Konkun, would, I am of opinion, apply also to the Taptee line; for the saving that could be effected by its gradients would be very small, while the cost of its maintenance would be greater, in consequence of the exposure to the floods and inundations, supposing the Taptee line to possess very easy gradients throughout; and, for the sake of comparison, I shall estimate them at £500, and ours at £600 per mile, which will give the gross working expenses of both lines between Callian and Julgaum as follows:—

<i>Taptee Line</i> ,—358 miles, at £500 per mile.....	£179,000
<i>Thull Ghaut Line</i> ,—226 miles, at £600 per mile	135,600

In favour of the Thull Ghaut Line	£43,400
---	---------

108. Future experience may show that I have here under-estimated the cost of working railways in India; but this consideration cannot affect the comparative rates which I have taken, because any increase in the working expenses would be in the rates of the mileage, and would, therefore, bear unfavourably upon the Taptee line.

109. In the year 1852, I made an estimate of the mileage receipts of the Thull Ghaut line, which was founded upon actual returns of the traffic. It amounted to £1,224 per mile; and upon this valuation, the gross receipts of the extension of your line from Callian to Julgaum (226 miles) would amount to £276,624. This sum ought not to be increased for the estimate of the gross receipts of the Taptee line, for the following reasons:—

1st.—That any increase of it would augment the charges to the public for the conveyance of goods.

2nd.—Because that line would then be exposed to a competition with the direct Thull Ghaut road,

3rd.—Between Bombay and Surat it would have to compete with the Native pattimars or coasting craft.

4th.—That, if the receipts upon the Taptee line were increased, it would be proper, for the purpose of a fair comparison, to increase the receipts of the Thull Ghaut line also.

110. The competition with the water carriage between Bombay and Surat would, I am sure, have a very serious effect upon the traffic of that part of the Taptee line (for the water carriage between Bombay and Tanna now conveys all the goods), although its relative cheapness, as compared with the railway charges, is not so great as it would be between Surat and Bombay, where the rates of water conveyance during the season are as follows :—

Surat to Bombay.

September and October.—Rs. $7\frac{1}{2}$ per ton, equal 0·94*d.* per ton per mile of railway distance.

November to February.—Rs. 4½ per ton, equal 0·53*d.* per ton per mile of railway distance.

April and May.—Rs. 20 per ton, equal 2·5*d.* per ton per mile of railway distance.

Average rate per month of fine season 1·12*d.* per ton per mile of railway distance.

Bombay to Surat.

Average rate through the season Rs. 5 per ton, equal 0·63*d.* per ton per mile of railway distance.

111. Thus the average rate of water carriage between Bombay and Surat, to and fro, is 0·88*d.* per ton per mile of railway distance; but the mileage rate, of which the gross receipts upon the Taptee line have been computed, was 2*d.*; so that the effect of competition could not fail to be very serious. It is therefore clear that no advantage can be claimed for the Taptee line, on the score of economy, in conveying the cotton from Khandeish to the cheap water carriage at Surat, without a corresponding sacrifice in its revenue between that port and Bombay.

112. The Thull Ghaut line would also afford greater capabilities for reducing the rates of conveyance, and by that means promoting the development of the traffic of this country; because the estimated gross receipts upon it are computed at a rate of 2½*d.* per ton per mile, with a double toll upon the Ghaut, while for the same amount of gross receipts upon the Taptee line the charge would only be 2*d.* Thus we should have a margin of ½*d.* per ton per mile, or about Rs. 8 in the whole journey from Bombay to Julgaum, for the reduction of the cost of conveyance upon the Ghaut line, before our receipts were lowered to the same amount as those of the Taptee line.

113. Looking to the competition between Bombay and Surat, and the destitution of local traffic along a great portion of the Taptee line, it will be rather favouring it in the comparison to take the gross receipts from Callian to Julgaum at the same amount for both lines. The case, as regards profit, would then stand as follows :—

Taptee Line, from Callian to Julgaum (358 miles): estimated

cost of construction	£2,626,646
Gross annual receipts	276,624
Annual working expenses (358 miles)	179,000

Annual surplus.....	£97,624
---------------------	---------

which is equal to a dividend of 3·7 per cent. per annum upon the cost of the line.

Thull Ghaut Line, from Wasindree to Julgaum (209 miles):

estimated cost of construction	£1,527,700
Gross annual receipts	255,816
Gross annual working expenses	125,400

Gross annual surplus	£130,416
----------------------------	----------

which is equal to a dividend of 8·5 per cent. per annum upon the cost of the line. The dividend in favour of the Thull Ghaut line would be 4·8 per cent. per annum.

114. Having stated the comparative merits of the Taptee and Ghaut lines in as clear and circumstantial a manner as I could, it will now be convenient to recapitulate the main results.

115. The distance from Bombay to Julgaum would be 131 miles less than by the Taptee line.

116. There would be a saving of 5½ hours for passengers, and 8½ hours for goods, in the journey from Khandeish to Bombay, and of 5 and 7½ hours from Bombay to Khandeish.

117. 149 miles less of new railway would have to be made, by the extension of the Ghaut line from Wasindree to Julgaum, than by the construction of the Taptee line from Callian to Julgaum; and a saving of at least £1,098,946 would be effected in the outlay.

118. The working expenses upon the Ghaut line would be £43,400 per annum less than upon the Taptee line; and, with the same amount of gross receipts, the net profits would be as 8·5 to 3·7 per cent. per annum in favour of the Thull Ghaut line.

119. The railway communication between the cotton marts and the port of Bombay might be completed two years earlier by the Ghaut than by the Taptee line; and the former would afford greater means of reducing the fares for the conveyance of goods between Bombay and Khandeish.

120. Objections have been very naturally taken to the formidable character of the Thull Ghaut incline, and some doubts as to the safety and efficiency of working it are expressed in the Minute of the Most Noble the Governor General, dated April 20th, 1853. I therefore feel it to be my duty to you to endeavour to mitigate the objections to the Ghaut incline, by endeavouring to reduce them to their just practical limits.

121. In the first place, the incline has been greatly improved, in the

following respects, since the first design of it was brought to the notice of the Government :—

122. The length of the steep gradients upon the incline has been shortened to the extent of 1 mile 22 chains, and is now only 5 miles 48 chains long, instead of 6 miles 70 chains. The gradient in the lower $1\frac{1}{4}$ mile may be flattened from 1 in 37 to 1 in 40.

123. The curves have been made easier, and the incline has been laid out with 2 miles $8\frac{1}{4}$ chains of straight line, in a length of 6 miles 61 chains, instead of only 57 chains in 7 miles 11 chains, as before.

124. The estimate of the incline has not been increased, while a material saving may be effected in the cost of the adjoining part of the line by the alterations.

125. When I reported upon the subject of the original incline, I had carefully ascertained the results of actual experience in the most analogous cases ; and it was evident to me, from that testimony, that there was no doubt as to the safety of working our incline. Since then, the question has been referred to Mr. Robert Stephenson, our Consulting Engineer, who, with the knowledge that this railway was designed to be the north-eastern trunk line from Bombay, has given his opinion, under date the 10th February 1853, respecting the safety and means of working the Thull Ghaut incline, in the following words :—

“I do not, however, participate in Captain Crawford's fears respecting the working of the down line of the Thull Ghaut incline ; but I believe that, with a proper system of breaks, and guard or guiding rails, on the sharper curves, it will be worked with safety, and at the least cost.”

126. Since this opinion was recorded, the improvements to which I have already referred have been made in the incline, and it therefore now applies still more forcibly in our favour. As regards the efficiency of the incline for the conveyance of traffic, it would, no doubt, be affected on the descent by the limit of safety, and on the ascent by the limit of locomotive power, in the load and speed of the trains.

127. Assuming 70 tons as the net load in goods for ascending, and 150 tons for descending trains, both of which are within the limits of experience upon inclines of similar steepness in Europe ; and taking average speeds of 8 miles an hour for goods, and 10 miles an hour for passenger trains up the incline, and of 10 and 18 miles an hour down it ; I am of opinion that manifold the quantity of the existing traffic of the road, both in the goods and passengers, might be safely conveyed upon the Thull Ghaut incline, if it were made with a double line of rails.

128. The superiority of the Thull Ghaut incline, when compared with the circuit of the Taptee line, may be succinctly stated as follows :—

129. The extra cost of making it would be equivalent to the addition of 37 miles in the length of the single line to be constructed ; but the Taptee line would require the construction of 149 additional miles of railway.

130. In working expenses, the Ghaut incline, and the approach to it, would be equivalent to an increase of 28 miles in the length of the railway; but the *détour* by the Taptee line is 131 miles.

131. The delay that would be incurred at the Ghaut, and upon the approach to it, would be equivalent to lengthening the journey 18 miles; but by the Taptee line the circuit would be 131 miles.

132. It is unfortunate that a line with such a formidable feature upon it as the Thull Ghaut incline should be incomparably the best for the north-eastern trunk line of India: but this is the inevitable result of the physical character of the country; for the Sahyadree Range, lying across the due direction of the railway towards Khandeish and Calcutta, and projecting $1^{\circ}30'$ northwards of it, renders the line ascending the Ghauts far superior to a line skirting them. The objections to it, however, assume a less formidable aspect when viewed in relation to the present means of conveyance along the several lines of communication to be affected by it. Taking, for instance, the carriage of cotton from Oomrawuttee to Bombay, a distance of 356 miles: there would be a delay of only half an hour in a journey of twenty-four hours, and an increase of 12 annas upon about Rs. 35,—a moderate charge for the carriage of a ton of cotton over that distance by railway; and this delay and addition to the fare become quite insignificant when we consider that the present duration of the journey is 32 days, and the cost of conveying cotton from Oomrawuttee to Bombay by bullock-carts amounts to Rs. 53 per ton.

133. In relation to the whole journey along the proposed extension of your railway to Mirzapore, the delay in ascending the Ghaut incline would be for goods one hour in about 56 hours, and half an hour in 39 hours for passengers, the present journeys by the road being about 40 and 60 days long. The increase of 12 annas in the fare at the Ghaut would be too inconsiderable for notice, for there would be a saving of at least Rs. 30 a ton upon the whole journey.

134. It now remains for me to report to you upon the subject of the superior eligibility of the Thull Ghaut to all other passes of the Sahyadree Range, for the ascent of the North-eastern Extension.

135. In the year 1852, I examined the country along the Ghaut verge from the Malsej to the Thull Ghaut; and in the Konkun I have inspected the country up the river Kaloo, and at the entrance to the river Chernal, and have had a survey made of the Basta. To the north of the Malsej Ghaut the Sahyadree Range is of the most impracticable character. Its general elevation is higher than any portion of equal length which I have yet seen, and its escarpment is very precipitous, throwing out low and irregular spurs, and presenting no possibility of finding a good railway ascent. Along the line of the Ghauts upon the Deccan, the country may be described as mountainous; and if it were practicable to lay out a favourable ascent up the Ghaut, no line could be found by which great difficulties would not have to be encountered. In addition to these objections, the approach along the Konkun to this part of

the Ghauts would have to traverse a tract of country of the most unfavourable character. The course of the valleys could not be pursued, on account of their tortuousness, and the bold character of their banks; and if the line were taken out of the valleys, the difficulties of the ground would be still greater, even up the Kaloo and Basta, which are the main rivers in that district. A railway could not be constructed without a constant succession of viaducts, tunnels, and heavy earthwork, nor without the continuous use of very sharp curves. It would, I am satisfied, be a complete waste of time to undertake any further operations, or examination of that district. I therefore directed my attention to the discovery, if possible, of a better line to the north of the Thull Ghaut.

136. I have made several inspections to the north of the Thull Ghaut. In the beginning of 1852, I carefully examined the course of the Wyturnee as far as Warree; and again, in 1853, that part of the Sahyadree Range between the Thull and the Sheer Ghauts; and in May last I extended my observations along the Ghauts, and upon the Konkun, as far as it appeared to me to be of any use to do so; and I have thus obtained a full knowledge both of the general and detailed character of that part of the country.

137. At the Thull Ghaut, there is an irregular spur or range of hills, extending for upwards of 30 miles past Kurdec, to the north of Shahpoor, in a direction generally parallel to the Bombay and Agra road, and dividing the rivers Jaunsa and Wyturnee on the north from the Basta on the south. By laying out our railway up the rolling ground along the south flank of these hills, we have been enabled to rise from the level of the Basta Valley, near Wasindree, to an elevation of nearly 1,000 feet at Kussara, and have thus reduced the length to be surmounted at the Ghaut to only 869 feet, although the Ghaut escarpment at Egutpoora is very nearly as high as at the Malsej or Bhore Ghaut. Even with the advantage of this spur, it would only have been practicable to have made the Thull Ghaut ascent with enormous works, if the spur had not broken down to a very low level at the Massoba Khind, through which our line passes from the Basta to the Wyturnee side of the hills; and then, entering the course of the nearest tributary of the Wyturnee, it climbs to the summit at Egutpoora.

138. This description of the route of the Thull Ghaut line will serve to show the peculiar facilities which we have there met with, and which fortunately lie in the direct line from Bombay to Khandeish, and along the present course of the traffic. In the extensive examination which I have made of the Ghauts, I have seen no feature at all comparable to it for railway purposes, apart from its advantage in point of direction.

139. Upon the north side of the Thull Ghaut, the main escarpment forms a crescent, in which the river Wyturnee descends through a deep, winding, and precipitous channel, into which several large tributary nullas fall from the Ghauts by great gorges through both its banks. Up one of these, called the Beema, our present incline ascends; but where it enters upon its course, the level of the railway is much above the broken ground of the Wyturnee Valley.

To the north of the Beema lie the Bokhunda and Nandanee nullas, which are quite impracticable for a railway ascent. The river Wyturnee breaks through the Ghaut verge in a south-westerly direction near Takee, and at that point its bed is upon a lower level than the main Ghaut escarpment; but this cannot be taken advantage of, in consequence of its winding course, and high precipitous banks, and the immense gorges that cut through them; and on account, also, of the deep falls in its bed.

140. On the north of river Wyturnee lies the Sheer Ghaut, which is much frequented by country traffic, because of its long, easy descent. The summit of the Sheer Ghaut is 92 feet higher than that of the Thull Ghaut incline; and from levels which were taken by Mr. Graham over the most favourable ground along the Ghaut ascent, a fall of 670 feet was found to exist between the summit and the village of Chodale, a distance of only three miles and a quarter, which would necessitate the use of a gradient of 1 in 26, and of 1 in 32 even, with a long tunnel at the summit. Below Chodale, the ground falls more gradually down to the river Beyla, but it is very rough; and, on descending the Ghaut, it was clear to me that the rest of it would be far inferior to the Thull Ghaut, for a railway incline, both as to curves and gradients. In addition to these objections, I have ascertained, by a careful and extensive examination of the country, that the approach to it along the Konkun would be impracticable, because the channel of the river Wyturnee is a deep wide gorge, with precipitous banks, varying from 200 to 350 feet high, winding through a country full of high and irregular hills; and the course of the Beyla is of a similar character, and equally ineligible. It was thus clear that an ascent of the Ghauts in that district could be effected only by an extension of the line which we had laid out from Shahpoor to Kussara and Mussoba Khind, along the southern flank of the hills. We therefore abandoned the Sheer Ghaut, and tried to find a better incline than the Thull Ghaut, by extending our line from Mussoba Khind past the village of Eleegaum, across the river Wyturnee, and thence up the Dewandee nulla by Paneghur, to a summit on the bank of the river Pahtree, near the village of Takee. This incline was laid out with great judgment by Mr. Graham, in November last. A section of it was taken by Mr. Darke, under his direction, and I carefully examined it in the month of May last.

141. From the result of our operations, I am of opinion that it is very inferior to the Thull Ghaut incline, for the following reasons:—The gradients and curves would be equally severe, and their length much greater. The crossing of the river Wyturnee would approach the maximum limits of engineering railway practice, and the line beyond the summit would traverse very rough ground for about four miles.

142. The summit of this incline on the west bank of the river Pahtree, and about a quarter of a mile beyond the verge of the Ghaut, would be as much as 1,039 feet above the bed of the Wyturnee at the place of crossing, where the banks of the river are 359 feet high. The length of that part of the incline

between the Wyturnee and the summit is 5 miles 68 chains; and taking 200 feet as the maximum height of the viaduct above the bed of the river, the total rise to the summit will be 839 feet, and the gradient 1 in 37.

143. From the Wyturnee viaduct to the present level of rails at Mussoba Khind, there would be a rise of 301 feet in a distance of about two miles and a half, which would require the use of a gradient of 1 in 43; but this gradient might be flattened to 1 in 46, as well as that from the Khind to the foot of the incline at the Mandhasheyt nulla to 1 in 40, by lowering the level of rails at the Khind 18 feet.

144. As this would be a rising gradient upon the descent of the Ghaut, it would be attended with the serious objection of necessitating the use of assistant engines in the downward as well as upward journey upon the incline.

145. From Mussoba Khind to the foot of the incline, the gradient would be 1 in 40 for a mile and three quarters.

146. The comparison of the gradients of the Dewandee and Thull Ghaut inclines would then be as follows:—

Thull Ghaut Incline.

	Miles.	Chains.
1 in 37	1	58
1 in 36	3	70
	<hr/>	<hr/>
	5	48

Dewandee Incline.

	Miles.	Chains.
1 in 40	1	60
1 in 46	2	40
1 in 37	5	68
	<hr/>	<hr/>
	10	8

147. The steep part of the ascent of the Ghaut would be four miles and a half longer; and inferior as the gradients of the Dewandee incline are, on account of their greater length, they could only be obtained by the construction of immense works on both sides of the river Wyturnee, and at its crossing, where the viaduct would be 320 yards long, and 200 feet high.

148. The low level of the Wyturnee precludes the possibility of making any material improvements in the gradients on either side of it; for the surface of the railway could not be raised there without increasing the dimensions of the viaduct beyond practicable limits.

149. The Dewandee incline presents no advantages whatever, and the country for several miles beyond it is very unfavourable.

150. From the Sheer Ghaut, I examined the range northwards as far as the Trimbuk and Anjonira Hills, and found it impracticable. The verge of the Ghauts becomes higher as it approaches these mountains, the spurs which project from it drop suddenly down to a low level immediately beneath it, and the adjoining part of the Konkun is of the worst description.

151. All the features of the country beyond the Amnatha Ghaut are most forbidding: the Deccan presents an unbroken rampart of hills; the Sahyadree Range is precipitous; and the Konkun is a strong hilly tract of country; while, to add to these objections, the course of the railway would have to make an extensive détour; for from whatever point it might be taken up the Ghaut between the Thull Ghaut and the Dang Hills, it would have to cross the Indhyadree Range in the neighbourhood of Munmar.

152. I am quite satisfied that there is no other route for ascending the Ghauts towards Khàndeish which it would not be a waste of time and expense to survey; and I certify that, to the best of my professional knowledge and judgment, there is no better ascent of the Sahyadree Range towards Khandeish than by the Thull Ghaut; that the present objectionable features in the Thull Ghaut line cannot be avoided with any advantage by the selection of another route; and that the Thull Ghaut line would be the best in an engineering point of view, and the most profitable from Bombay to Khandeish.

153. I beg, therefore, to recommend that the Government should be requested to sanction the selection of the Thull Ghaut line as a trunk railway from Bombay to Khandeish, and across the peninsula; and since it has been proved that this line is the most valuable to your interests, and is the one most urgently required by the commercial necessities of this part of the country, I am of opinion that no time should be lost in making arrangements for its construction.

154. The first object to be accomplished is the completion of the line from Bombay to Julgaum; and as the works upon the sections from Wasindree, our present terminus, to the top of the Ghaut, are by far the heaviest, it would be expedient that this portion of the line should be commenced with the least possible delay, and that the extension from Egutpoora to Julgaum should be finished simultaneously, or as nearly so as possible.

155. Having fully reported upon that portion of the North-eastern Extension which has now been laid out and surveyed, and having, I hope, satisfactorily proved the merits of the Thull Ghaut line from Bombay to the cotton districts of Khandeish and Berar, it would, I conceive, be premature, and could lead to no practical results, for me to dilate upon all the capabilities of extension in various directions which your railway possesses.

156. The examination and surveys of the country are progressing, and will, no doubt, be extended as far as may be necessary for ascertaining the most useful and economical lines which the country affords; and as these operations are completed, the extensions of your railway will be reported to you in the same detailed and practical manner as I have endeavoured to adopt, on this occasion, with reference to the extension from Munmar to Jubbulpore.

I have the honour to be, &c.

(Signed) J. J. BERKLEY.

Bombay, Railway Office, 6th October 1854.

No: 1.

Return of Traffic on the Boorhanpoor and Indore Road, taken out on the Trestlee Bridge over the Nerbudda, at Kherfy Ghaut, from April 1853 to May 1854.

Months, 1853-54.	Foot Passengers.	Bullocks and Horses.	Carts.	Camels.	Male Asses.	Palanquins.	Sheep and Goats.	Gigs and Carriages.	Elephants.	Buffaloes.
April, 1853	2,070	3,707	497	22	22	4	8	..	..	..
May	1,622	2,597	343	19	44	..	6	..	..	..
June	1,924	3,150	309	25	11	1	..	..	..	..
July	1,030	551	39	6	13	..	..	..	..	..
August	1,501	1,386	34	2	16	2	4	..	..	..
September	1,538	1,944	38	6	13	3	2	..	..	..
October	1,724	2,567	240	36	11	2	4	..	..	..
November	1,742	2,312	451	42	68	1	18	..	..	..
December	1,889	4,540	553	19	14	1	16	..	..	..
January, 1854	2,238	512	6,627	33	22	..	4	..	..	..
February	2,464	6,937	644	44	27	1	6	..	..	..
March	1,995	6,856	502	27	40	..	..	..	..	..
April	2,445	4,496	468	46	47	..	8	..	..	..
May	1,959	4,445	408	44	50	2	26	..	..	..
Total	26,141	46,000	11,183	371	398	17	102	..	..	..

(True copy)

(Signed) E. W. ANSON,
First Assist. Agent to Governor General, for Central India.

(Signed) R. H. KEATINGE,
Political Assistant in Nimar.
(Signed) R. N. C. HAMILTON,
Agent, Central India.

Nimar Political Agency, Mundlaiser, 7th July 1854.

No. 2.

Return of Traffic on the Agra and Bombay Road, taken out on the Trestlee Bridge over the Nerbudda, at Akbarpoor, from April 1853 to May 1854.

Months 1853-54.	Foot Passengers.	Bullocks and Horses.	Carts.	Camels.	Elephants.	Asses.	Buffaloes.	Palanquins.	Sheep and Goats.	Gigs and Carriages.
April, 1853	6,346	1,274	1,454	126	3	26	31	3	18	2.
May	7,984	1,543	1,811	147	9	18	19	16	62	6
June	2,336	2,236	803	172	1	1	73	8	1	1
July	1,514	2,877	205	265	3	1	38	2	..	..
August	3,537	1,365	594	288	1	15	127	1	95	..
September	2,904	544	494	62	..	9	24	..	4	..
October	4,917	596	1,159	254	..	10	35	1	66	1
November	3,537	1,365	594	288	1	15	127	1	95	..
December	9,633	1,306	1,369	125	4	33	67	15	160	..
January, 1854	9,871	1,611	1,438	39	..	39	52	9	2	..
February	9,357	1,698	1,689	339	6	77	198	19	272	6
March	7,694	1,277	1,482	44	..	20	66	5	145	1
April	9,804	1,795	2,097	210	11	17	74	14	30	5
May	14,316	1,742	1,898	86	7	12	17	27	14	4
Total	95,750	2,1229	18,087	2,445	46	293	938	121	964	26

(True copy)

(Signed) R. H. KEATINGE,
Political Assistant in Nimar.

(Signed) E. W. ANSON,
First Assist. Agent to Governor General, for Central India.
Nimar Political Agency, Mundlaiser, 7th July 1854.

No. 3.

Return of Goods sold in four Bazars, and of Goods passing four points in Nimar, for A. D. 1853, calculated in Tons.

	Tons Import.	Tons Export.	Total Tons.	Calculation of business transactions in tons.
Pundarwah Bazar	1,128	789	1,917	
Singojee Fair .....	....	....	195	
Oonkarjee Fair .....	....	....	214	
Khundwa Fair .....	....	....	176	
Lonee Purgunna	Hurda to Bombay. 1,115	Bombay to Hurda. *	Total. 3,341	
Asseer	General Trade to Bombay. 1,036	General Trade from Bombay. 1,452	2,488 Total.. 5,829	A. D. 1853, in tons.
Bukatghur	Kurda to Indore. 3,261	....	Total. 3,261	
Kheryput	Boorhanpoor to Indore. 2,897	Indore to Boorhanpoor. 430	3,327	Traffic for 1853.

(Signed) R. H. KEATINGE,
Political Assistant in Nimar.

GREAT INDIAN PENINSULA RAILWAY.
NORTH-EASTERN EXTENSION.

TABLES OF GRADIENTS AND CURVES.

FROM MUNMAR TO JULGAUM.—SECTION No. 1.

SCHEDULE No. I.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 102 .....		....	0	40
1 in 132	0	71	4	2
1 in 138 .....		....	1	40.5
1 in 142 .....		....	3	40.5
1 in 150	0	44	4	10.5
1 in 152 .....		....	2	10
1 in 156 .....		....	1	30.5
1 in 160 .....		....	1	0.5
1 in 169 .....		....	1	29
1 in 173 .....		....	1	9.5
1 in 177 .....		....	2	75.5
1 in 180	0	46		....
1 in 183	0	49		....
1 in 186	1	5		....
1 in 200 to level.	13	25	42	16.5
Level.		Miles. Chains.		
		17	10.5	
		Miles. Chains.		
Total length.....	100	0		

FROM JULGAUM TO NIMBOLA.—SECTION NO. 2.

SCHEDULE NO. II.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 100	0*	38.5		
1 in 132	0	63	0	65.5
1 in 165	1	19		
1 in 200 to level	27	17.5	11	37.5
	Miles. Chains.			
Level	11	39		
	Miles. Chains.			
Total length.....	53	40		

FROM NIMBOLA TO ASSEER.—SECTION NO. 3.

SCHEDULE NO. III.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 100	1	68	....
1 in 110	2	67.5	....
1 in 117	0	50	....
1 in 118	1	24	....
1 in 126	1	11.5	....
1 in 135	0	73.5	....
1 in 141	0	65	....
1 in 150	0	34	* 0	35
1 in 158	0	33	....
1 in 161			0	31
1 in 200 to level	5	24.5	5	5
	Miles. Chains.			
Level	1	77		
	Miles. Chains.			
Total length	23	39		

FROM ASSEER TO CHARWAR.—SECTION No. 4.

SCHEDULE No. IV.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
l in 132	4	39.5	3	26.5
l in 138	2	15		.....
l in 140 .....		.....	3	22.5
l in 152 .....		.....	1	42.5
l in 160 .....		.....	3	5
l in 167	1	11		.....
l in 170 .....		.....	1	38
l in 176	4	24.5	2	47
l in 183 .....		.....		.....
l in 188 .....		.....		.....
l in 200 to level	6	17.9		.....
		Miles.	Chains.	
Level		6	6	
		Miles.	Chains.	
Total length		53	49.5	

FROM CHARWAR TO RIVER TOWA.—SECTION No. 5.

SCHEDULE No. V.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
l in 150 .....		.....	0	28.7
l in 176	1	16		.....
l in 200 to level	32	37.5	28	4
		Miles.	Chains.	
Level		11	62	
		Miles.	Chains.	
Total length		73	68.2	

FROM RIVER TOWA TO KATIOTIA.—SECTION No. 6.

SCHEDULE No. VI.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 100 .....		....	0	49
1 in 144 .....		....	0	46
1 in 148 .....		....	0	67
1 in 150	0	64	0	18.5
1 in 156	1	1.5		....
1 in 168	1	19		....
1 in 171	0	49		....
1 in 172 .....		....	0	60
1 in 176	1	8.5		....
1 in 177	1	4.5	0	29.5
1 in 180	1	21		....
1 in 182	0	79	0	63.5
1 in 184 .....		....		....
1 in 185	0	48		....
1 in 200 to level	29	73.4	31	1.5
Level.....		Miles. Chains.	12	64.5
Total length.....		Miles. Chains.	87	47.4

FROM KATIOTIA TO JUBBULPORE.—SECTION No. 7.

SCHEDULE No. VII.

Gradients.

Rate of Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 100	0	71		....
1 in 110 .....		....	0	74
1 in 150	0	56	0	64
1 in 176	1	45	1	1
1 in 196 .....		....	0	53.5
1 in 200 to level	22	40.8	8	45.5
Level.....		Miles. Chains.	16	66.5
Total length.....		Miles. Chains.	55	34.3

FROM MUNMAR TO JULGAUM.—PLAN No. 1.

SCHEDULE No. VIII.

Curves.

	Miles.	Chains.
40 chains radius	5	43
50 ditto	0	31
60 ditto	0	58
80 ditto	2	36
90 ditto	2	10
100 ditto	7	15
120 ditto	3	9
170 ditto	0	73
180 ditto	1	11
200 ditto	3	4
Straight .....	.73	30
Total length.....	<u>100</u>	<u>0</u>

FROM JULGAUM TO NIMBOLA.—PLAN No. 2.

SCHEDULE No. IX.

Curves.

	Miles.	Chains.
40 chains radius	1	34
60 ditto	0	34
80 ditto	4	63
120 ditto	0	41
140 ditto	0	49
160 ditto	0	9
200 ditto	4	13
Straight	41	37
Total length.....	<u>53</u>	<u>40</u>

FROM NIMBOLA TO ASSEER.—PLAN No. 3.

SCHEDULE No. X.

Curves.

	Miles.	Chains.
40 chains radius	2	45
60 ditto	5	53
80 ditto	3	11
Straight	12	10
Total length.....	<u>23</u>	<u>39</u>

FROM CHARKEIRA TO THE RIVER TOWA.—PLAN No. 5.

SCHEDULE No. XI.

Curves.

	Miles.	Chains.
80 chains radius	1	78
120 ditto	1	54
200 ditto	3	17
Straight	40	51
Total length	47	40

FROM THE RIVER TOWA TO KATIOTIA.—PLANS Nos. 6 AND 6a.

SCHEDULE No. XII.

Curves.

	Miles.	Chains.
40 chains radius	0	34
80 ditto	6	75
120 ditto	0	65
160 ditto	12	58
320 ditto	0	77
Straight	65	58
Total length	87	47

FROM KATIOTIA TO JUBBULPORE.—PLAN No. 7.

SCHEDULE No. XIII.

Curves.

	Miles.	Chains.
40 chains radius	1	45
60 ditto	1	35
80 ditto	6	1
Straight	46	33
Total length	55	34

(True copy)

(Signed) THOS. R. WATT,
Secretary.

NORTH-EASTERN EXTENSION.

FROM JUBBULPORE TO MIRZAPORE AND ALLAHABAD.

To the COMMITTEE OF DIRECTORS of the
GREAT INDIAN PENINSULA RAILWAY COMPANY.

GENTLEMEN,

Since the 6th October 1854, when I had the honour to address you upon the subject of the North-eastern Extension of your railway from the town of Munmar to Jubbulpore, the whole of the railway surveys in this direction, which at the request of the Honorable Court you undertook to execute, have been completed.

2. The North-eastern Extension has been laid out and surveyed from Jubbulpore to a junction with the East Indian Railway at Mirzapore. The country between Rewa and Allahabad has been carefully examined, with the view of ascertaining whether a more favourable line than that to Mirzapore would be practicable in that direction, or whether the country presented such facilities as to make it advisable to construct a fork line to Allahabad on the one side, and to Mirzapore on the other.

3. A branch line has also been laid out and surveyed from Julgaum, in the province of Khandeish, to Oomrawuttee, the principal cotton depôt of Berar and to Nagpore; and a trial section has likewise been taken from Nagpore to Jubbulpore, for the purpose of determining the superiority or otherwise of constructing the trans-peninsular line in that course, instead of along the route which I have already described to you, by Asseerghur and the Valley of the Nerbudda, to Jubbulpore.

4. For the sake of presenting these important subjects to you with great perspicuity, it may be expedient for me, in the present instance, to confine my subject to the extension of your railway from Jubbulpore to Mirzapore and Allahabad, reserving for a separate Report the consideration of the line from Julgaum to Oomrawuttee, Nagpore, and Jubbulpore.

5. At Jubbulpore, we had carried the survey to a distance of 606½ miles from Bombay, and by our subsequent operations we have now completed it to Mirzapore, comprising a further extension of about 237 miles, and making the total length of the North-eastern Extension, from Bombay to Mirzapore, 843½ miles, or thereabouts.

6. I have divided that portion of the railway which was comprised in our last season's operations into four sections, which, for facility of reference, I have numbered continuously with those executed in the previous season, as far as Jubbulpore.

7. The Maps, Plans, and Sections which accompany this Report are,—

No. 17.—A General Map, showing the Course of the proposed Extension from Jubbulpore to Mirzapore.

No. 18.—Plan of the proposed Extension from Jubbulpore to Myheare.

No. 19.—Ditto ditto from Myheare to Khutkurry.

No. 20.—Ditto ditto from Khutkurry to Mirzapore.

No. 21.—Section of the proposed Extension from Jubbulpore to Myheare.

No. 22.—Ditto ditto from Myheare to Khutkurry.

No. 23.—Ditto ditto from Khutkurry to Mirzapore.

8. For the purpose of executing the office work connected with the surveys as far as Jubbulpore, Mr. Graham and some of the Assistant Engineers remained at that station during the monsoon of 1854, and were thus enabled to commence operations upon the extension beyond it at the earliest practicable date. The opening of last working season was unusually wet, and unfavourable for the execution of our field-work; but this impediment did not deter Mr. Graham, and Messrs. Bodington, C. J. Hawkes, Winteringham, and F. A. Hawkes, from its prosecution; and I have much pleasure in expressing to you my opinion that the whole of the survey has been done by those gentlemen in a masterly style; and, considering the extent, remoteness, and the difficulties of the country, with very great despatch. I beg also to record that, in consequence of my inability, from other engagements, personally to inspect the country, the line has been selected* by Mr. Graham; and with a thorough knowledge of its merits, acquired from his reports, I consider that he has done it with great judgment and success. It will be my duty to take an early opportunity of examining the country, particularly where the most important features of our line occur; but I do not anticipate that my inspection will result in any material alterations in the present route of this extension.

9. Leaving Jubbulpore, the line diverges from the course of the river Nerbudda, and gradually ascends to the watershed line between the tributaries of that river and of the Ganges; and for the first 100 miles it closely follows the course of the great Deccan road from Jubbulpore to Mirzapore. Commencing in the 448th mile, it proceeds, with very easy curves and gradients, and with very light works, past Sohagee, to the Perrihat nulla, which, after traversing some ground much cut up by nullas and ravines, it crosses in the 454th mile. This bridge will be inconsiderable. The bed of the nulla is sandy, but secure foundations may be obtained at a few feet below its surface. Passing close to the town of Paneghur, the line crosses on a level the Jubbulpore and Mirzapore road at 458 miles, and thence proceeds over a very nearly level plain to the east side of Gosulpoor, at 463½ miles, and crosses the river Harun in the 469th mile. This viaduct will be 76 yards long. The bed of the river is composed of a sandy soil, but the foundations may be laid on rock at 12 feet below the surface.

10. Between 470 and 474 miles, where three small cuttings are shown

upon the section, the line encounters the first of several detached hills, which rise out of the plain, and close in near Dungaven; and a short distance beyond that place, at the 482nd mile, it reaches the summit, between the tributaries of the Nerbudda and the Ganges, which is surmounted on both sides by gradients of 1 in 150, the ascending incline being about two miles and a half long, and the descending only half a mile. In order to obtain this favourable passage of the summit, the Jubbulpore and Mirzapore road is crossed at 478½ miles. Descending from the summit, the line continues nearly straight past Chupra, Salimabad, Teneree, Nandgaon, Piprooh, and Dehori, to the 497th mile, where it crosses the road, for the purpose of avoiding a formidable range of hills which stretches away to the west in the 500th mile. Keeping close and parallel to the road past Jinjry, the line re-crosses the road by an over-bridge at 500½ miles, in order that the most favourable course may be obtained over the Katna nulla, and the low flooded ground which lies between the 502nd and 505th miles. The bed of the Katna nulla is composed of rock, and only a small bridge will be necessary. From the low ground at the 505th mile, the line rises in nearly a straight course past Chaka, and by easy gradients, to the south-western end of the Kymoor range of hills, which it crosses near Kurreah, at the 512th mile, and then enters the narrow valley which intervenes between the Bundair Hills on the north, and the Kymoor Range on the south.

11. No large works will be necessary in this neighbourhood, the only one worthy of notice being a cutting containing 69,000 cubic yards in the 507th mile.

12. Passing the Kymoor Range, the line descends by very easy gradients, and with very light works, past Kumarea, and thence in a straight line to the 521st mile, where it enters some flooded ground, which it traverses for four miles past Nowgaon; and thence proceeds past Kenra, Mahada, Berowlee, and Jhymar, to the Koosree nulla, which it crosses at 537½ miles. At 542 miles, the road from Budumpoor to Myheare is crossed, at a distance of two miles and a half from Myheare, and at 543½ miles the line reaches the river Tons, where Section No. 8 terminates.

13. The Tons bridge will be about 60 yards long; and as the bed of the river is there composed of strong rock, and is dry early in the season, no engineering difficulties will have to be encountered in building it. The whole of this section is of a highly favourable character, notwithstanding the crossings of the Nerbudda and Ganges watershed line, and of the west end of the Kymoor Range, and the proximity both of those and the Bundair Hills. All the works are so light as to present nothing worthy of further notice, and it will be seen, on reference to the appended Table of Curves and Gradients, that out of 97 miles there are 93 miles either level or of first class gradients, and 75 miles of straight line.

14. The principal stations that will probably be required along this portion of the extension will be at Paneghur, Gosulpoor, Salimabad, Moonwarra, and Jokhai, at about 512 miles, for Nagode, Saugor, and Myheare.

15. Section No. 9 commences at 543½ miles, and in the 546th crosses the

river Sarunggee. The Tons might have been crossed below its junction with that river, but it is a very small stream, requiring a bridge only 30 yards long, for the purpose of avoiding which it would certainly not be worth while to make a *détour* in the line. From this crossing, the line proceeds with unexceptionable features by Jurwa, Jaal, Purdwa, Buckana, Munygow, Karundee, and Tamaree, to the river Beehur, which it should cross by a viaduct 76 yards long, at the 577th mile, where the channel narrows, and the bed consists of strong rock. About half a mile beyond the Beehur, the line crosses on a level the road from Muckunpoor to Rewa, at a distance of less than two miles from the latter, which is the principal town of the Rewa territory. From this point, it runs for three miles, nearly straight, to the river Bechia, which it will cross slightly on the skew, by a viaduct 60 yards in length.

16. Beyond this crossing, the line runs nearly straight, for 24 miles, to Tomree, closely keeping the direction of the Bechia nulla. It then traverses for four miles the slightly elevated ground between the Bechia and the Odda nullas, the latter of which it crosses at the 607th mile, not far from the village of Berkera. This stream brings down a great deal of water during the monsoon, but is dry soon after its close; and the foundations are good. A small bridge of 30 yards long will be sufficient for crossing it. From this nulla, the line runs over smooth ground by Dera nearly straight to Mowgungee, at the 618th mile, meeting along its course with no works worthy of special mention, excepting the crossings of the Burdara and Silar nullas, which resemble the Odda in every respect, and a cutting of 33,000 cubic yards at Mowgungee, which will yield excellent ballast. At 620 miles, the Gara nulla is crossed, where the bed is deep; but as it consists of rock at our point of crossing, the bridge, 40 yards long, will be a moderate and easy work. At a short distance beyond it, the Jubbulpore and Mirzapore road is crossed on a level by our present line, and again near the village of Khutkurry, at 627 miles, where Section No. 9 ends.

17. In consequence of the last eight miles of this section, and also a length of about ten miles beyond it, having been completed before the Hutta incline had been selected, it was found necessary to alter the course of the railway from the village of Choahauna, at the 624th mile. This accounts for the distortion that appears upon the plan from the 619th to 627th mile; but there is no reason whatever why a direct line should not be laid out between these points, and the two level crossings of the Jubbulpore and Mirzapore road be thereby avoided, as the deviation would occasion no material difference in the section. Time would not have been well bestowed in making a fresh plan and section of this portion of the line: having drawn attention to it, the alteration can be easily effected when the line is staked out for construction.

18. Along the whole of Section No. 9, the character of the railway is unexceptionable. The works are extraordinarily light: the steepest gradient is 1 in 170; and out of 84 miles, 82 miles are either level or of first class gradients, and 70½ miles straight.

19. The principal stations upon it should, I think, be at Réwa and Mowgungee.

20. From the village of Khutkurry, where Section No. 10 begins, the line rises in nearly a straight course to the top of the incline which has been selected for the railway descent of the Kymoor range of hills, near the village of Hutta, in the 643rd mile. In ascending to this point, the gradients are all favourable, and no large works are encountered.

21. I now proceed to describe to you the Hutta incline, which was laid out, surveyed, and levelled with the greatest care by Mr. Graham, whose reports enable me to submit the subject to you in a detailed and accurate manner.

22. The range of hills, or, more exactly speaking, the precipitous step from the table-land of Central India down to the level of the Ganges Valley, upon which the railway incline is situated, appears to belong to the Vindhya Mountains, which, stretching north-east from Bhopal to about 25° of latitude, there extend nearly due east, until they join the Kymoor Range, the northern boundary of the Valley of the Soam. The mountainous range, which lies across the course of our line, appeared to be of a uniform character within the extensive limits of Mr. Graham's examination. Proceeding eastward over the table-land, there is at first a slight rise to its crest: the fall is then most abrupt, being nearly at all points an escarpment, varying from 100 to 300 feet in depth, from the foot of which a very steep and generally uniform slope descends to the plain, which is practically level at the very foot of the slope. It is only where this escarpment fails, and the steep slope near the base of the range becomes continuous to its crest, that any road, even for bullocks, can be obtained. The geological structure of the hills is sandstone, overlying shale. The great Deccan road descends this precipitous mountain step by the Kuttra Pass, where Mr. Graham first directed his search for suitable ground for the railway incline. By means of a sharp zigzag at the bottom, a rather easy descent, about two miles and a half long, is obtained for the road; but the Kuttra Pass is in no way adapted for a locomotive incline.

23. After the country had been examined to the west as far as the Goorma nulla falls, he attempted to obtain an incline by means of a spur westward of the Kuttra Pass, near the villages of Atrazee and Lohrindur, which are shown upon the accompanying general map. It was found, however, that the fall was there 700 feet in a length of only three miles and a half. Having failed at that spot, Mr. Graham proceeded to examine the hills to the east of the Kuttra Pass, and fixed upon the present point of descent, about 13 miles to the south-east of it. The village of Hutta, which will be found on the map, is near its summit; and by that name, therefore, it may be convenient to designate the incline. At this point, on approaching the Kymoor Hills, the range turns due southwards, and it is down its main flank, but in a northern or reverse direction, that our incline descends, where a length of six miles of steep falling ground is obtained.

24. To the east of the incline, a low range of hills rises, on the other side of which flows the Adh nulla, at about the same level as the table-land, until it

descends by falls to the plain. The flank of the range down which the incline has been laid out is of precisely the same character as the face extending east and west, which I have already described. The short spurs which jut out from it are as precipitous as the main range, and it is the recurrence of these, and the intervening nullas and ravines, upon our incline, which necessitates the formidable array of tunnels and viaducts which the section presents.

25. In our operations at the Sahyadree Ghauts, we were fortunate enough, as I have already reported, to meet with long spurs at the Thull and Bhoze Ghauts, extending so far into the plain of the Konkun as to enable us to carry our railway up them with continuous locomotive gradients. Had such a favourable feature existed here, it would have been immediately taken advantage of; but the spurs are all too short to afford suitable ground for that purpose, and it has only been found practicable to lay out a locomotive incline along the main flank of the range: the physical obstacles which fill the section with extensive works were, for this reason, inevitable.

26. At the summit of the incline, there is a length of 34 chains of level, beyond which, at 642½ miles, it descends the range of hills by the following gradients:—

	Miles.	Chains.
1 in 45.....	4	21
Level	0	24
1 in 100.....	0	30
1 in 48.....	2	23

27. The changes in the direction of the incline are shown in detail upon the plan, but the following list is an abstract of the lengths of straight line and curves:—

	Miles.	Chains.
30 chains radius.....	1	13
40 ditto	1	63
60 ditto	1	10
80 ditto	1	0
Straight.....	2	12

The last mile has been entered as straight because, although a short curve of 80 chains radius is represented upon the plan at the foot of the incline, a straight line can be substituted, without any objectionable effect upon the line.

28. The principal works upon it are:—

Tunnel No. 1	540 lineal yards.
„ No. 2	110
„ No. 3	500
„ No. 4	707
„ No. 5	209
„ No. 6	396
Viaduct No. 1	90
„ No. 2	30
„ No. 3	100

Viaduct No. 4	66 lineal yards.
„ No. 5	270 „
„ No. 6	90 „

Earthwork.

Cutting, No. 14	169,420 cubic yards.
Embankment, No. 15	101,833 „
„ No. 17	155,789 „
„ No. 20	266,577 „
„ No. 24	177,774 „
„ No. 25	451,353 „

29. These works are undoubtedly extensive; but the ground presents great facilities for their construction. It is most favourable for the tunnelling, which the contour of the ground will admit of being executed with considerable despatch. Tunnel No. 1 can be worked with shafts; No. 4 both with shafts, and adits driven into the side; Nos. 2, 3, and 5 most favourably with adits; No. 6 perforates a neck which stretches across at right angles to the course of the incline, and could not therefore be worked by side adits. It is not, however, a long tunnel, and if it were found requisite, shafts might be sunk on both sides of the neck where the height of the ground decreases. The rock might be easily mined or quarried, and would afford excellent building stone for the viaducts. The shale that will be met with near the base of the cuttings appears to be firm and dry, and might be cheaply excavated. The material is also very suitable for making solid and durable embankments.

30. My estimate of the Hutta incline, which has been formed for a double line of railway throughout, to be constructed with the same heavy description of permanent way materials as the Bhore Ghaut, is as follows:—

Title of Section.	Length.	Earthwork.	Tunnels, Viaducts, Bridges, and Culverts.	Permanent Way, Fencing, Level Crossings, &c.	Establishment, Engineering Charges, and Contingencies.	Rolling Stock, and Stations.	Total.	Average Cost per Mile.
	Miles.	£	£	£	£	£	£	£
Hutta Incline.....	7½	191,600	156,500	57,100	34,500	19,400	399,100	52,340

31. With respect to the whole of the works upon this incline, I am of opinion that no formidable difficulties or costly contingencies are likely to arise; for, as I have already stated, the character of the ground is in every way favourable for their construction.

32. The cost of this incline, regarded as a separate feature upon the North-eastern Extension, is very considerable; but a reference to the summary estimate in paragraph 43 of this Report will show in how small a degree it affects the average mileage cost of the whole line.

33. From the Sahyadree Range to Mirzapore, a distance of 750 miles, the

whole course of the line is attended with unusual facilities ; and the section is, with very few exceptions, of the most economical description. The Hutta incline stands prominently out upon it as a concentration of nearly all its extensive works ; but, upon economical grounds, that concentration ought, I think, to be regarded as more favourable than our case would have been if the same works had been dispersed along this vast extent of railway ; for although they would not have appeared so formidable upon the section, they would have been less advantageously placed, both in respect of the cost and despatch of their construction.

34. It is to the ultimate working of the incline that we must look for the principal objections to it ; and, under this point of view, a little consideration will serve to show that it should neither constitute a practical barrier to one of the most important lines of railway communication that could be established in this country, nor, when taken in connection with the rest of the extension, ought it materially to affect the cost, the safety, the despatch, or the convenience of that communication.

35. The gradients which we have already obtained upon it are superior to those of the Thull Ghaut incline, the objections to which I placed before you in their full practical extent in paragraphs 132 and 133 of my Report of the 6th October 1854.

36. It is unnecessary for me to submit to you similar calculations for the Hutta incline, as, in this case, the country affords no other route with which we are called upon to compare the merits of that which we have selected as the best ; but having carefully considered the matter, I am of opinion that the Hutta incline may be worked both more cheaply and with greater expedition than the Thull Ghaut.

37. Traversing, as the North-eastern Extension does, productive districts, abounding in traffic, the extra working expenses which the Hutta incline would involve are too unimportant a matter to present any serious objection to its construction. The delay which it would occasion in the journey along your line is hardly worth notice ; the power of working it safely is at the present stage of railway experience unquestionable ; and it would be capable of carrying a much larger quantity of traffic than would be requisite in order to establish indisputably the merits of the North-eastern Extension, either as a commercial undertaking, to be executed by your company, or as a public work.

38. At the foot of the Hutta incline, the railway takes a northern course over a nearly level plain, the adjoining gradient being 1 in 237 for a mile and a quarter, succeeded by two miles of level. It runs past Muihgaon, Juggerha, and Laen, near which, at the 660th mile, it crosses the Beyhm. This river is 440 yards wide, and is charged with a strong current during the rains ;—the highest flood was 21 feet above its bed. In the due direction of our line, there is a long and deep pool in the river channel, in order to avoid which it was necessary to lay out the line more to the west, where it would cross the Beyhm at right angles, and upon a dry bed of strong rock. The length of the viaduct is 450 yards.

39. From the Beyhm, the line runs nearly straight, and in a direction parallel to the Jubbulpore and Mirzapore road, past Atralee, Sunnereea, and Buttera, on the south of the small town of Lalgunge, where for two miles it follows very closely the course of the main road past Tutulkee and Tulsee, as far as the 675th mile, where it should pass under the road. From this point, the descent of a small ghaut commences, with more than a mile of straight line. It is called the Tara Ghaut. The total descent is 181 feet in four miles, of which the main fall is 140 feet in two miles and a quarter. Although this is designated by the formidable name of a ghaut, it does not present any seriously objectionable features upon our section. The gradients by which the descent is effected are,—

	Miles.	Chains.
1 in 180	1	19
1 in 100	2	43

There are no works of particular importance upon it, the principal being three rather extensive embankments; but these may no doubt be lessened hereafter, by laying out the line a little higher up the face of the hill, near the centre of the 1 in 100 gradient. At 680 miles, the Jubbulpore and Mirzapore road is again crossed, and at 680½ miles the line crosses the Hurry, by a bridge 39 yards long. This river is much flooded, but the bed of its channel is composed of hard kunkur, and no difficulty will be encountered in building the bridge. Proceeding nearly straight along the course of the main road, past Leelka and Lhondee, it crosses the river Lhondee. This is also much flooded, but a bridge 39 yards long will be sufficient for it; and although the bed of the river is of a softer nature than at the Hurry, good foundations may no doubt be obtained at a little depth below the surface. From this crossing, the railway proceeds nearly straight to 684½ miles, where Section No. 10 ends, terminating the North-eastern Extension in an open space on the southern side of the hospital at Mirzapore, and to the east of the Jubbulpore and Mirzapore or great Deccan road, which is to be crossed by the East Indian Railway near this point; so that it will probably be the site of their Mirzapore station. The course of that railway was not definitively laid out at the period of our operations, but as we have taken up its level, and have entered the neighbourhood in rather more detail upon the plan, there should be no difficulty in representing a junction at any time.

40. Throughout Section No. 10, the line maintains its highly favourable character in every respect, except at the Hutta incline and at the Tara Ghaut, which I have already fully described to you.

41. The principal stations upon it will probably be at Hutta, Lalgunge, and Mirzapore.

42. Throughout the whole line from Jubbulpore to Mirzapore, the country presents very great facilities for railway construction. Near Gosulpoor, about 20 miles from the former station, it leaves the black alluvial soil, and only meets with it again in patches in the lower valleys. Nearly every cutting

will produce ballast of what is here still called moorum, and of kunkur at the Mirzapore end of the line. The ground is generally most favourable for excavation, and good building stone may be obtained at a convenient distance from any part of the line.

43. The following is my estimate of the North-eastern Extension from Jubbulpore to Mirzapore, to which, for the sake of convenient reference, I beg to add the summary of the estimate of the line from Wasindree to Jubbulpore, contained in my Report of the 6th October 1854 :—

NORTH-EASTERN EXTENSION.

Abstract Estimate of a Single Line from Wasindree to Mirzapore, with a provision for a complete Double Line at the Thull Ghaut and Hutta Inclines.

No. of Sections.	Titles of Sections.	Mileage.	Earthwork.	Tunnels, Viaducts, Bridges, and Culverts.	Permanent Way, Fencing, Level Crossings, &c.	Establishment, Engineering Charges, and Contingencies.	Rolling Stock, and Stations.	Total.	Average Cost per Mile.
	From Wasindree to Jubbulpore ..	556½	£ 421,200	£ 605,400	£ 1,871,600	£ 301,000	£ 406,000	£ 3,652,000	£ 6,478
8	From Jubbulpore to Myheare....	96	49,100	28,900	354,600	43,300	63,000	538,900	5,613
9	From Myheare to Khutkurry....	83½	33,100	20,500	308,400	36,200	48,800	447,000	5,353
10	{ Hutta Incline.....	7½	131,600	156,500	57,100	34,500	19,400	399,100	52,340
	From Khutkurry to Mirzapore.	49½	34,600	37,700	180,500	25,300	46,900	325,000	6,533
	Total	793½	669,600	849,000	2,772,200	440,300	584,100	5,315,200	6,699

44. A comparison of the items of this estimate will serve to show how very large a proportion of the cost of the extension will consist of the permanent way expenses. I have calculated these upon the assumption that all the iron materials will be imported from England ; but I am of opinion that a very reasonable probability exists of our being able to effect a large reduction in the cost of a considerable portion of the permanent way, by obtaining some of the iron materials from local sources of supply.

45. With reference to the traffic of the district through which the line from Jubbulpore to Mirzapore would pass, I have very little to add to the remarks and returns which I had the honour to submit to you in my last Report.

46. The railway would run close to the villages of Paneghur and Gosulpoor, in the immediate neighbourhood of which are some iron mines, which are worked for export from the district.

47. Myheare and Rewa are the only towns of considerable size along this portion of the line ; but the whole country is thickly populated, as a reference to the map will show. It is also rich in agricultural produce, and that part of the Rewa country which it traverses between Amarpatan and the Hutta incline may rank amongst the most highly cultivated districts in India. The traffic along the great Deccan road principally consists of goods and passengers passing to and fro from Jubbulpore to Mirzapore, to which I more particularly alluded in my last Report.

48. We endeavoured to obtain some statistical returns of traffic ; but it would appear that they are very deficient, as that from Commissioner Lowther, in the Appendix, is the only one that we procured.

49. The Lieutenant Governor of the North-western Provinces, when informed by Mr. Graham of the deficiency of the statistical returns of traffic, was pleased to order them to be taken on all the main roads for a period of twelve months. When these are completed, they cannot fail to afford valuable information as to the extent and direction of the traffic of the district.

50. I would also mention here, although it may not be directly connected with the section of the North-eastern Extension, that officers are now engaged, on behalf of Government, in surveying the coal and mineral districts of the Nerbudda Valley.

51. Having been instructed to survey the North-eastern Extension either to Mirzapore or to Allahabad, I requested Mr. Graham to examine the country towards the latter place, with a view of laying out a line in that direction, if it presented such manifest engineering advantages as to make it more eligible than that which we had surveyed to Mirzapore. There can, however, be no doubt that this large town is, commercially, a much better and more important terminus for your railway than Allahabad. It is the great emporium for all articles of export from the Nerbudda Valley, and through it all the imports of European goods, &c. enter. It lies nearly in the direct trans-peninsular route from Bombay to Calcutta, and is the principal town upon the great Deccan road.

52. Had it not been for the existence of the Hutta incline, I should have been prepared decidedly to advise you to construct the direct line to Mirzapore; but seeing that incline had proved to be so formidable a feature upon our line, and yet was the best that could be found in the direction of Mirzapore, it became highly expedient to examine the range of hills to the west, for the purpose of finding an alternative line to Allahabad, free from the severe gradients and heavy works of the Hutta incline; and of ascertaining whether the engineering facilities of the country, and the movements of the traffic, were such as to make it worth while to construct a fork line, both to Allahabad and Mirzapore.

53. With this view, Mr. Graham explored the range of hills by Nyagurhee, Acoury, and Joudpoor, to Sohagee; thence to Kintee, on the Mohance nudee; across the Beehur and Tons river to Simmereea and the Mynha Ghaut. This was the extreme limit to which it was necessary to carry the inspection, as in that neighbourhood those hills are approached which form a part of the range stretching to the south-west, and dividing the valleys of the Cane and Tons rivers.

54. Between Nyagurhee and Sohagee the main escarpment of the range which I have already described in paragraph 22 is almost unbroken, and there are only a few places at which laden bullocks can descend the hills, and those are barely passable even for them.

55. At the Sohagee Ghaut, by which the road from Jubbulpore, striking off from the great Deccan road at Manjgowa, descends towards Allahabad, the slope of the hills is rather flatter, and, by the use of frequent zigzags, a very good road has been laid out. The pass, however, is quite impracticable for a railway.

56. Between Sohagee and Mynha, the rivers Mohanee, Beehur, and Tons cross the range by unbroken falls of 300, 360, and 200 feet, while cliffs, 300 and 400 feet high on each side, enclose the chasms into which their torrents pour. Every nullah, too, that descends this part of the range, has its own unbroken fall, as deep as those three rivers.

57. Although the Jumoha river, to the west of the Tons, appears on the map to make a longer and easier descent, it was found to be no exception, being a cascade rushing down a ravine enclosed by precipitous hills.

58. The Boming Ghaut, by which it was reported that laden bullocks descended, was also examined, and, from its appearance, the report seemed hardly credible.

59. On approaching the Mynha Ghaut, one of the hills upon the tableland, to which I have alluded as dividing the rivers Tons and Cane, has to be crossed at a height of 150 or 200 feet. The ground then falls again to the Mynha stream, from the level of which it rises slightly to the crest of the range of hills. The only course which seemed to offer the remotest chance of a railway descent was by a spur projecting westwards; but its length proved to be only two miles and a half.

60. The plain at the foot of the hills is more elevated than at the Hutta incline, and the height of the range itself is not so great; but the country beyond it, in the direction of Allahabad, is covered with hills, which extend to the banks of the Jumna.

61. From Mr. Graham's examination and reports, I very much doubt whether a railway incline, practicable for locomotives, could be obtained at the Mynha Ghaut; and it is quite evident that neither in respect of gradients nor straightness of direction could it afford the advantages we have found upon the flank of the hills by which the Hutta incline descends.

62. This being the case, it was useless to extend the examination to the country below the Mynha Ghaut, where, although a railway might be laid out, its course would be tortuous, and its construction difficult. Moreover, in addition to these objections to the Mynha Ghaut route to Allahabad, the approach to the top of the range would be very inferior to that of the Hutta incline.

63. It is therefore evident that the country towards Allahabad does not present any engineering advantages, which could make it advisable to construct an alternative line to that place instead of Mirzapore.

64. With respect to the construction of a fork line to Allahabad, as well as Mirzapore, I beg to state briefly the reasons which prove to my mind the inexpediency of that course, and which lead me strongly to recommend you not to adopt it.

65. Those who form their impression of its merits from merely examining the map might deem it advisable to accommodate both Allahabad and Mirzapore by a fork line; but the branch to Allahabad could only be obtained by the construction of an additional incline, of a far more objectionable character than the Hutta, or it would have to diverge from that to Mirzapore below the Hutta incline. It would then be within 35 miles of Mirzapore, which will soon be put into direct communication with Allahabad, by means of the East Indian Railway.

66. Our Allahabad branch would therefore be practically almost parallel to that line, and it would have to cross the river Tons between Sohagee and Allahabad, at a point where it is not less than half a mile wide.

67. The section of your railway from Jubbulpore to Mirzapore is not only a necessary link in the trans-peninsular communication, but is essential to your line, as the means of extending it to a suitable terminus. * It must derive a large traffic from its own proper districts, and, in addition to that, a very great and rapid increase of traffic will infallibly result from the advantage it will possess in a continuous railway communication from your terminus at Mirzapore to Calcutta,—for that portion of the East Indian Railway will certainly be completed before the line from Jubbulpore can be constructed. It would also be convenient to commence operations upon this section at an early date, because the construction of the East Indian Railway has brought contractors into the field, and offers considerable facilities for the prosecution of our works. The supply of much of the permanent way materials for this

section of the North-eastern Extension need not be dependent upon the completion of the line from Bombay, because they could be shipped direct to Calcutta, and be conveyed thence both cheaply and expeditiously to the line. I am satisfied that it would greatly promote the interests of your Company to construct the section of the railway from Jubbulpore to Mirzapore with all possible despatch; and I recommend you to make, without delay, such arrangements for vigorously prosecuting the works upon it as may be found practicable, without further impeding the progress of the extension of your railway up the Thull Ghaut to Khandeish. Unfortunately, this has already been too long delayed; and therefore, while I would duly impress you with the value of that distant part of your undertaking between Jubbulpore and Mirzapore, I would not advise you to divert your chief and earliest exertions from the construction of that line, the merits of which you have taken so much pains, and incurred so much expense to establish, and which I have always represented to you, and still regard, as the most important, and the most urgently needed portion of the railway communication which the Great Indian Peninsula Railway Company has projected.

68. The General Map No. 2, showing the course of the railway from Asseerghur up the Valley of the Nerbudda to Jubbulpore, and the General Map No. 17, representing the course of the line onwards from Jubbulpore to Mirzapore, a tracing of which is now forwarded, have been compiled with great care in my office; and as they will be for some time most convenient for reference, I request that they may be neatly printed in England, and that 100 copies of each may be forwarded to Bombay for official use.

I have, &c.
(Signed) J. J. BERKLEY.

Railway Office, Poona, 20th July 1855.

APPENDIX.

No. 10 of 1854.

From T. B. PEARSON, Esq., Collector and Magistrate of Allahabad,
To R. LOWTHER, Esq., Commissioner, Allahabad Division.

Dated Allahabad, 23rd February 1854.

SIR,

I have the honour to acknowledge the receipt of your letter No. 9, of the 17th ultimo, with its annexure, relative to the Sohagge road, and to transmit a statement which has been furnished to me by Mr. Deputy Magistrate Carnegie, of passengers and vehicles, which crossed the Jumna at Bulwa Ghaut, from 16th June to 31st December last. It is not in my power to specify the proportion of them which appertain to the Sohagge road in particular.

2. The history of this road will be found in the letter addressed by the same officer, under date the 16th November 1852, to Mr. Tucker, late Secretary to the Local Committee, and forwarded by the latter gentleman to you with his letter of the 18th idem.

3. The traffic which passes along the road is large, and consists of the following articles:—

Imports.—Iron, cloth (green), quicklime, green ginger, rope-grass, bamboos, bamboo baskets, bamboo clubs, sugarcane, turmeric, cummin seed, zumincund (a vegetable root), red and yellow ochre, round arum, teekhoor (*Curcuma leucorrhiza*), wooden hooka tubes, wooden combs, wooden charraghidums, grain of all sorts, cotton, cleaned and uncleaned, mahoorā (flowers of the broad-leaved *Bassia*), goats, and oxen.

Exports.—Cloth, soft sugar, molasses, saltpetre, refuse salt, hemip, and reh (impure carbonate of soda).

4. It is stated that, along a portion of the road in the Rewa territory, tolls are levied at several places upon the merchandize that passes; and that if these tolls be abolished, and the road made thoroughly good, by being metalled and bridged to Mungoma, the traffic might be expected to increase considerably. Under these circumstances, and with reference to the very great amount of the sums which have been expended upon the road, it appears to me that it would be a matter of much regret if Government should now determine not to complete it.

I have, &c.

Magistrate's Office,
Zillah Allahabad, 23rd February 1854.

(Signed) T. B. PEARSON,
Collector and Magistrate.

(True copy)

(Signed) J. ATLUR, Head Clerk.

Statement of Passengers and Vehicles which crossed Bulwa Ghaut Ferry from 16th June to 31st December 1853.

Foot Passengers.	Cattle, laden.		Cows, Bullocks, and Buffaloes, unladen.	Ditto ditto, laden.	Ditto in droves of 20 and upwards, per 100, unladen.	Ditto ditto, laden, per 100.	Donkeys, laden or unladen.	Tattoos or Mules, with Riders, or laden.	Ditto, led, or unladen.	Horses, with Riders, or laden.	Ditto led, or unladen.	Rahals, with Riders, Drivers, and Bullocks.	Both, with ditto ditto.	Kakas.	Huggies, and one-horse Carriages.	Two-horse Carriages.	Four-horse Carriages.	Carts, with Bullocks, and Drivers, empty, per Bullock.	Ditto laden, per Bullock.	Elephants.	Palanquins, Coolies, or Mearnahs, with two Bearers.	Ditto, with four Bearers.	Ditto, with six Bearers.	Ditto with eight or more Bearers.	Sheep, Swine, and Goats.	Four-wheeled Waggon, four Bullocks, laden.	Ditto ditto, empty.	Ditto ditto, two Bullocks, laden.	Ditto ditto, empty.	One-horse two-wheeled Cart, laden.	Ditto ditto, empty.	One-horse four-wheeled Hack Carriage, laden.	Ditto ditto, empty.	
	Unladen.	Laden.																																
Crossed from north to south.....	112,308	7,273	144	40	10,887	714	..	43	1,731	155	108	38	3	43	..	..	..	140	62	10	206	103	41	24	573	..	..	..	..	..	..	..	..
Crossed from south to north	85,520	24,773	88	365	3,012	17,030	..	155	57	1,895	84	708	16	51	3	52	4	..	50	103	11	201	90	41	33	8,683	..	..	1	..	..	..	..	..
Total.....	197,927	32,046	232	414	13,899	17,744	..	155	100	3,626	139	376	54	36	6	95	9	..	208	165	21	407	202	32	57	9,156	..	..	1	..	..	..	..	..

(Signed) J. ARUN.	(True copy)	(Signed) T. B. PEARSON,	(Signed) P. CARNEGIE,
Head Clerk.		Magistrate.	Deputy Magistrate.

GREAT INDIAN PENINSULA RAILWAY.

NORTH-EASTERN EXTENSION.

TABLES OF GRADIENTS AND CURVES.

FROM JUBBULPORE TO MYHEARE.

SCHEDULE NO. I.

Gradients.

Rate of Inclination.	Rise		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 50	2	57	0	39.50
From 1 in 200 to level ..	26	21	52	20
		Miles.	Chains.	
Level.....		11	27.81	
		Miles.	Chains.	
Total length.....	96	5.31		

FROM MYHEARE TO KHUTKURRY.

SCHEDULE NO. II.

Gradients.

Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 170	1	41		
From 1 in 200 to level..	33	25	36	56
		Miles.	Chains.	
Level.....		11	76.39	
		Miles.	Chains.	
Total length	83	41.39		

FROM KHUTKURRY TO MIRZAPORE.

SCHEDULE NO. III.

Gradients.

Inclination.	Rise.		Fall.	
	Miles.	Chains.	Miles.	Chains.
1 in 45 .....	....	....	4	21
1 in 48 .....	....	....	2	23
1 in 100 .....	....	....	3	33
1 in 132 .....	....	....	1	8
1 in 150	1	18	....	....
1 in 165	3	38	....	....
1 in 177 .....	....	....	1	26
1 in 180 .....	....	....	1	18
1 in 198 .....	....	....	2	32.5
From 1 in 200 to level..	11	58	9	70
		Miles.	Chains.	
Level.....		15	3.16	
		Miles.	Chains.	
Total length.....		57	28.66	

FROM JUEBULPORE TO MYHEARE.

SCHEDULE NO. IV.

Curves.

	Miles.	Chains.
40 chains radius	1	44
60 ditto	2	17
80 ditto	11	44
100 ditto	0	53
120 ditto	2	51
160 ditto	2	28
Straight	75	8.31
Total length.....	96	5.31

FROM MYHEARE TO KHUTKURRY.

SCHEDULE NO. V.

Curves.

	Miles.	Chains.
80 chains radius	12	50
160 ditto	0	32
Straight	70	39.39
Total length	83	41.39

FROM KHUTKURRY TO MIRZAPORE

SCHEDULE NO. VI.

Curves.

	Miles.	Chains.
30 chains radius	1	13
40 ditto	4	53
50 ditto	0	76
60 ditto	1	10
80 ditto	10	69
160 ditto	2	55
280 ditto	2	19
Straight	33	53.66
Total length	<u>57</u>	<u>28.66</u>

(True copy)

(Signed) THOS. R. WATT,
Secretary

(True copies)

W. HART,
Secretary to Government.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. XX.—NEW SERIES.

MEMORANDUM

ON THE

**WATER OF NULLAS IN JUNGLE
DISTRICTS,**

AS PRODUCTIVE OF DISEASE;

AND THE

**NECESSITY OF PROVIDING WELLS AS THE INDISPENSABLE
PRELIMINARY TO THE MATERIAL IMPROVEMENT
OF SUCH DISTRICTS.**

By A. BETTINGTON, C. S.:

WITH THE

OPINIONS

OF THE

**MEDICAL BOARD, THE CONSERVATOR OF FORESTS.
THE TWO REVENUE COMMISSIONERS,**

AND THE

SEVERAL COLLECTORS;

AND

THE RESOLUTION OF GOVERNMENT PASSED THEREON.

B o m b a y :

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1855.

CONTENTS.

	PAGE
Memorandum by Mr. A. Bettington, C. S.	1
Minute by the Right Honorable the Governor, concurred in by the Honorable Messrs. Warden and Lumsden, dated 25th August 1854	4
Letter from Assistant Surgeon F. Manisty, Secretary to the Medical Board, dated 18th September 1854, No. 2107	5
Letter from Dr. Gibson, Conservator of Forests, dated 20th November 1854, No. 1070	ib.
Letter from Mr. H. W. Reeves, Acting Revenue Commissioner, S. D., dated 7th December 1854, No. 3836	7
Memorandum from Mr. J. N. Rose, Collector of Sattara, dated 22nd March 1855, No. 203	10
Memorandum from Mr. E. G. Fawcett, Revenue Commissioner, N. D., dated 19th July 1855, No. 2583, with accompaniments.	11
Resolution of Government, No. 3889 of 1855, passed under date 11th Sep- tember 1855	19

MEMORANDUM
ON THE
WATER OF NULLAS IN JUNGLE DISTRICTS,
AS PRODUCTIVE OF DISEASE; AND THE NECESSITY OF PROVIDING
WELLS AS THE INDISPENSABLE PRELIMINARY TO THE
IMPROVEMENT OF SUCH DISTRICTS.
BY A. BETTINGTON, C. S.

In my Revenue Reports for 1838-39 I adverted to the subject of the Water in Jungle Districts as the chief cause of the fevers which prevail in those districts.

I had then had charge for some years of the Kitoor and other Jungle Talookas in the Southern Mahratta Country.

I have since had many opportunities of observation in the jungles at the foot of the Neilgherry Mountains, in Guzerat, Ceylon, and other countries, all tending to confirm the opinion *that the health of the population of jungle districts is more affected by the bad water which they drink throughout the year, than by the malaria, which, however deadly, is only in operation for a very limited period.*

The Government sanctioned a proposition I made at that time, and several wells were dug in Kukery, one of the most unhealthy of the said jungle districts. Soon after, I was obliged by sickness to leave the Southern Mahratta Country, or I should have extended these operations, being confident the result would have been satisfactory to Government.

The people of the districts referred to have no supply of water, except from the nullas. The leaves of trees, many of them (pronounced by botanists to be) poisonous, are carried down by the periodical rains, and left in the deeper pools. This water, bad at all times, is especially so in the hot months, when the pools are isolated, the water stagnant, and (as explained above) full of decomposed vegetable matter.

This applies more or less to all jungle districts (*and tanks fed by jungle streams require gratings and filtering* apparatus, or they are subject to the same influences*) in all the forest country from Western Khandeish, Canara,

* In the Report on the proposed Lake at Vchar, provision, I think, is made for filtering.

Bala Ghaut, and the Mysore to the Wynaud Forest. It is notorious that the water produces fever and affections of the spleen. The Natives are well aware of it; so are all Europeans, who, whether for business or field sports, or both, have been much in the jungle.

To those who reside always in these little-favoured districts, constant sickness and premature old age are the infallible consequences;—enlarged spleen and wasted limbs are sure and fearful evidences of the disease which carries them to the grave.

The subject is one that merits attention; and if it can be shown to the satisfaction of Government that means can be found to improve the climate of jungle districts (including a vast tract of the Bombay and Madras Presidencies), to the great benefit of the people,—and, as a necessary consequence, a great improvement in the revenue, and general condition of those districts,—I doubt not they will be adopted after due inquiry to test the soundness of the opinions here put forward; and I would suggest that the Conservator of Forests, and other officers who have been much in the jungle, should be requested to confirm or refute what I have alleged, viz.—That it is a positive fact (in many instances within my own personal knowledge), that wherever in a jungle district a well has been dug, affording a supply of good spring-water, there has been a remarkable improvement in the health of the people.

A reference to the Collector of Belgaum would show the number of wells dug by my orders at Kukery and elsewhere, at the period above referred to, under the orders of Government, and the result.

I have no official document to refer to, but I can state from memory some cases in point:—

Jambotce, a large village, notoriously unhealthy. The Desae constructed a well: the inhabitants became healthy, and continued so.

At Tullywarce no one appeared to escape the fever. A well was built there by my order: the fever disappeared. It is now about fourteen years ago; there has been no return of endemic fever.

At Hemergah, six miles distant, there is no well: to drink the water for one week invariably produces fever.

At Teerutkoondce, the tank-water produces fever; the water of a spring at the same village is wholesome, and those who drink from it are exempt.

Chandghur is very healthy. Other villages, north and south, having the same relative bearing to the jungle and the Ghauts, are subject to fever.

Chandghur has good water.

It would be useless to multiply instances,—the same principle applies to all the forests of the Sahyadrees as well as to the great forest in Ceylon: there also certain villages are more unhealthy than others, and this is universally attributed, and I believe with justice, to bad water.

There is no novelty in the point I have here advanced:—

Ubi bonæ sunt aquæ, ibi bonus.

Ubi malæ, malus itidem est aer.

The question appears to be whether the remedy I suggest is sufficient and effectual.

I doubt not some difference of opinion will be found to prevail as to how much of disease is to be assigned to bad water, and how much to malaria.

I am prepared to admit that there are certain localities which can never be made healthy; but I view these as exceptional cases, and believe that many of our jungle districts can be rendered *comparatively free from fever*, and to the inhabitants absolutely healthy, simply by the construction of wells, and supplying them with spring-water; and that when these districts are brought *properly under cultivation*, there will be a *still further amelioration in the climate*, and, by consequence, the general condition of such districts.

The western districts of Dharwar, Belgaum, Kolapore, Sattara, Poona, Nuggur, and Khandeish, are all improvable in this manner.

I would propose that certain villages should be selected, where the water is decidedly bad, the soil in the neighbourhood good, so as to afford reasonable prospect of return hereafter (the Kukery Keriati,* for example), and let wells be there constructed, at certain selected sites. Very little persuasion or encouragement on the part of the District Officer will be necessary to induce the people to congregate at these central points, and it will be no matter of regret that one healthy and well-peopled village should supersede half a dozen wretched, fever-stricken hamlets.

These hamlets consist of a few huts, formed of materials found on the spot, and the people, from the prevailing fever, are constantly migrating from one site to another.

It is by no means necessary for the due cultivation of the district that all these hamlets should be inhabited: if the sites for wells were judiciously chosen, there villages would be built, and from thence, as from a common centre, the neighbouring lands would be cultivated, and the less favoured sites would become (as it is desirable they should be) abandoned altogether as dwelling-places. The material for building is procurable everywhere in the jungle; the measure involves no loss or hardship to the people in the abandonment of houses, nor outlay to Government beyond the first cost of the well.

In conclusion, I would only further remark that wells, whether in the jungle or the plain, require care,—they are sometimes altogether neglected: mud and refuse accumulate (washed into the well when the parapet wall is imperfect); overshadowed by trees; quantities of leaves fall into the well; noxious plants are allowed to grow round the sides of the well; and it is especially deserving of notice that both the roots and leaves of many of these plants which love the water *are poisonous*.

I have remarked in particular the *Lobelia nicotianæ foliæ* and the Boke (recognised by botanists as the *Microcillus*, which belongs to the *Euphorbiaceæ*)—and both are poisonous in a high degree; there are, no doubt, many others.

* The Kukery Keriati, under Belgaum.

I would beg to recommend that the Collectors should order an annual return from all their Mamlutdars, certifying—

1st.—That all the wells in the month of May, or before the 6th June, where the water is lowest, have been cleaned out; and all plants, of whatsoever kind, growing in or near the well, removed.

2nd.—That all trees growing over or near the well have been cut down, with the single exception of the Banyan tree. This should be exempt, not only in deference to the superstition of the people, but also from its innoxious character, and on account of the comfort its shade affords to travellers. The branches which actually drop over the well ought to be removed. The Mamlutdar should direct this annual cleaning of the well, and removal of rubbish, by the villagers; and as it is done for their own special benefit, it should involve no expense to Government.

These remarks may appear trivial; and it may be supposed that, if really needed, their own interest and advantage would have taught the Natives to take these simple precautions without order. But experience proves that neither the people, nor the heads of villages, nor the heads of districts, will trouble themselves about such matters, *unless compelled thereto by standing orders, rigidly enforced, under the personal supervision of European Officers in their tours through the country.* The attending to or neglecting these apparently unimportant details often constitute the difference between healthy and unhealthy villages, especially in the jungles.

A. BETTINGTON.

MINUTE BY THE RIGHT HONORABLE THE GOVERNOR,
CONCURRED IN BY THE HONORABLE MESSRS. WARDEN
AND LUMSDEN.

DATED 25TH AUGUST 1854.

The above Memorandum has been furnished to me by Mr. Bettington. I wish for the opinion of the Medical Board, Conservator of Forests, and several Collectors, on the suggestions contained therein, and that the Collector of Belgaum should be applied to for information as to the result of the measures formerly taken by Mr. Bettington.

(Signed) ELPHINSTONE.
J. WARDEN.
J. G. LUMSDEN.

25th August 1854.

No. 2107 OF 1854.

To the SECRETARY TO GOVERNMENT, Territorial Department, Revenue.

SIR,—With reference to your Endorsement No. 4229, of 13th instant, I am directed to state, for the information of the Right Honorable the Governor in Council, that in the opinion of the Medical Board, the suggestions contained in Mr. Bettington's paper deserve much attention. It is, they believe, unquestionable that decomposing organic matter, in suspension or solution, is found in the water of rivers, brooks, and nullas, in greater or less proportion.

2. Ordinarily, the quantity may be insufficient to act injuriously; but it cannot be doubted that water strongly impregnated with it is deleterious.

3. The Board could refer to recent instances (not in jungly districts, however) in which such impure water induced serious disease in bodies of men (fever and bowel complaints), which was at once checked by water being procured from purer sources.

4. It corroborates Mr. Bettington's opinion, too, that the Natives in jungly districts in Khandeish formerly (and possibly now) attributed these fevers and enlarged spleens to the bad water of their districts.

5. The Board cannot venture to affirm that "the water of jungle districts is the chief cause of the fevers which prevail in those districts"; or that "the health of the population of jungle districts is more affected by the bad water which they drink throughout the year, than by the malaria, which, however deadly, is only in operation for a very limited period"; but they think that the measure proposed by Mr. Bettington is deserving of attention, and, if carried out, that it will be productive of benefit.

6. Individually, no Member of the Board has lived much of a jungle life; and therefore, if the reference to the Conservator of Forests, and other Officers who have been much in jungles, has not been made, the Board would respectfully submit that it should be attended to, since they are disposed to think that their opinions may be found to be much in unison with those of Mr. Bettington.

I have the honour to be, &c.

(Signed) F. MANISTY, Assist. Surgeon,
Secretary, Medical Board.

Bombay, Medical Board Office, 18th September 1854.

No. 1070 OF 1854.

From the CONSERVATOR OF FORESTS,

To the SECRETARY TO GOVERNMENT, Revenue Department.

Camp Calicut, 20th November 1854.

SIR,—In replying to the subject of the reference made under date 13th September, No. 4230, regarding the comparative effects of spring and

stagnant water in forest districts, I have the honour to state my opinion, that from what I have seen, I may say that there is considerable foundation for the view taken by Mr. Bettington.

2. Thus the dwellers in Kolwan, and other parts of the northern part of the Tanna Zillah, mostly use the water procured from wells, and it is well known that these people are not peculiarly unhealthy, but rather the contrary, though they mostly inhabit valleys clothed with thick jungle.

3. So also in Alibagh, where there is much forest, but wells are numerous, sickness from malaria is not very common. The contrary is the case in the adjacent territory of the Ilubshce; and it might be of interest to ascertain whether the people there drink well or stream water.

4. Again, many of the villages south-east of Ahmednuggur, and situated in the valleys opening on the Bheema, are very unhealthy, enlarged spleen being a most common disease. In these, the people almost always drink the water of the streams, which water is strongly impregnated with lime. There is no jungle whatever about these villages, but only stony, semi-barren plains. Further, I note that in many villages along the Kookree, and other rivers of the Joonere district, albeit situated in bare black plains, enlarged spleen, and malarious fever consequent thereon, are very prevalent complaints; but I do not observe any tendency to these affections in adjacent villages or towns where well or fountain water are consumed. In proof of the latter fact I can instance Dungurwaree, and other places where I have an opportunity of intimately knowing the state of health of the inhabitants.

5. There are, again, other places, such as the Dangs of Surat, and some of the valleys of Baglan, where no amount of well-water will suffice to neutralize the malaria incident to the locality; but the principle is one which should, I think, be kept in view, and applied, when practicable, in places where the malaria or malarious water is so hurtful as seriously to affect the population rate of the village.

6. In many cases, sanitary arrangements, involving a change of water, will be found to be most difficult in carrying out, from the indisposition of the people themselves to change so convenient a source of supply as that from a river. This I take to have been one cause of the utter failure of the attempt to transplant the village of Baz in Baglan from its present locality (notoriously one of the most unhealthy even in Baglan) to a more elevated sloping ground, having a supply of water from wells. I believe that the same passive resistance would be found to take place in many other places where Government might wish to interfere in changing the source of water supply.

I have the honour to be, &c.

(Signed) ALEX. GIBSON,
Conservator of Forests.

No. 3836 OF 1854.

TERRITORIAL DEPARTMENT, REVENUE.

Poona, Revenue Commissioner's Office, 7th December 1854.

In reply to the Government Memorandum No. 4233, of the 13th September last, the Acting Revenue Commissioner Southern Division has the honour to report as follows.

2. The opinions of the Collectors have been obtained, and are submitted for the consideration of Government in the following summary:—

3. “The Collector of Poona (Mr. Jones) has no hesitation in stating that Mr. Bettington’s suggestion is an excellent one.”

4. The Acting Collector of Ahmednuggur (Mr. Bell) is of opinion that the most practicable mode of effecting the object aimed at by Mr. Bettington will be found to be a notification to the inhabitants of each village, explaining to them the noxious effects of drinking bad water, and the advantages obtainable, at the cost of a little trouble, by keeping wells in a state of cleanliness, removing trees, vegetation, and rubbish of all kinds.

5. Mr. Bell thinks that the village and District Officers should be made to see to the cleanliness of the wells used for drinking.

6. He would further require Assistant Collectors to visit the village wells.

7. Mr. Bell observes that it is not clear in what manner, or by what agency, the orders proposed by Mr. Bettington can be enforced, if coercive measures are intended for the purpose of procuring compliance with them. There are, he adds, no individuals who can be charged with the duty of cleaning wells, nor any law by which they can be held directly and generally responsible for inattention to any orders which may be issued.

8. The Collector of Sholapore (Mr. Loughnan) states that two of his districts, Indec and Hypurga, are annually afflicted with fever, cholera, and failure of crops, because the monsoon supply of water is not preserved by a system of dams. The scarcity of trees, and elevated nature of the country, prevent much of the water being retained. What is retained is liable to all the objections represented by Mr. Bettington. The cleansing of wells, he remarks, is much neglected; but how to enforce it, without the aid of legislation, he finds it difficult to suggest, *since* every effort for the general introduction of the Municipal Act has proved vain.

9. Mr. Loughnan thinks it right that the people should bear the expense of providing drinking water for themselves.

10. As the rays of the sun decompose water, and the air causes evaporation, and the high winds convey injurious matter to the water, however carefully vegetation may be cleared away from the open mouth of a well, he would propose the construction of *long* wells, with so small a width as to enable each to be vaulted or arched over the whole length, with little additional expense. He would not allow steps to the water’s edge, but have the water

drawn up from a parapet. This would prevent bathing, washing clothes, and copper pots.

11. Finally, Mr. Loughnan recommends the adoption of Mr. Bettington's suggestions.

12. The Collector of Dharwar (Mr. Rose) concurs in the opinion of the Acting Collector of Ahmednuggur. He objects to Mr. Loughnan's *long* wells, without steps, that the benefit of them would be very much confined to those who can afford to pay servants to draw water for them, and be lost in a great measure to those who have to depend on themselves or the women of their household.

13. The Acting Collector of Belgaum (Mr. Havelock) is of opinion that although disorders of the liver and spleen, and severe epidemics, may often be traced to the use of bad water, it is not established that a supply of pure well-water, where such disorders prevail, would prevent them. He also expresses a doubt as to whether good well-water could always be found in localities where that procured at present from tanks, streams, or pools is deleterious.

14. As a rule, however, Mr. Havelock assumes that the water of a well in *constant use* is wholesome. Stagnation is to be guarded against. He adduces an instance in Khandeish, of stagnant water being rendered wholesome by use.

15. Mr. Havelock adduces another instance, also in Khandeish, of running water being considered more actively injurious than miasma, which prevails at Nowapoor all the year round. The water of this stream, during the unhealthy months, has a peculiar appearance and taste, cognizable by any one, and becomes in March, April, and May, both palatable and wholesome : but strange to say, a well in constant use in the same locality has the same peculiar disagreeable taint, and is equally unwholesome with the water in the stream.

16. With respect to the wells mentioned by Mr. Bettington as having been constructed by him when Assistant Collector of Belgaum, Mr. Havelock finds, upon inquiry, that the wells at Jambotee and Tullywarce are salubrious, and that much benefit has been derived from them.

17. The spring at Teerutkoondie is said to be not in general use, owing to its distance from the village.

18. The water at Chandghur is on all hands allowed to be good ; but general opinion does not seem to hold Chandghur more healthy than other villages in the same line of the Ghauts.

19. Mr. Havelock suggests that the leaves which fall into a well in constant use do not affect the salubrity of the water : for instance, the water of a garden well, worked for irrigation, is generally pure and wholesome, notwithstanding the quantity of leaves often found in it. Mud accumulated at the bottom of a well can be removed at intervals, as occasion requires ; leaves also can be removed at once if necessary.

20. Mr. Havelock expresses himself desirous of securing to the people a supply of good water, but averse from laying down strict rules for the observance of village and District Officers, which cannot be carried out.

21. The Collector of Rutnagherry (Mr. Spooner) concurs in the opinion expressed by the Acting Collector of Ahmednuggur, and has no remarks of his own to offer.

22. It will thus be seen that the wells dug by Mr. Bettington have effected good; also that the Collectors of this division admit the propriety of procuring for the different communities under their charge a supply of wholesome water, wherever it may be wanting or practicable. The propriety of preserving the water used for drinking in a wholesome state is also admitted; but there is a question as to the means of enforcing cleanliness.

23. The Acting Revenue Commissioner is very much of Mr. Havelock's opinion, that as long as wells are in constant use, the water which they contain is, as a general rule, wholesome. He would not lose sight of the fact that minerals must and do operate powerfully in determining the properties of water; and he is convinced that Natives are excellent judges of water; and that if it can be had good, they will instinctively avoid that which is bad.

24. Existing rules (Government orders, dated 4th September 1835) appear sufficient to enable Collectors to procure the construction of wells wherever they may be wanted. If the inhabitants of a village require a well, the Collectors and their Assistants have it in their power to advance a sum of money, which will in some cases cover the whole, and in others a considerable portion, of the necessary expense. In surveyed districts especially, the villagers cannot be at any loss to supply themselves with good water where it is obtainable.

25. Of the villages mentioned by Mr. Bettington, the Acting Revenue Commissioner knows that Jamboter, Chandghur, Tullywaree, and Hemadgee, are still very feverish, and that cholera is as frequent in them as in the surrounding localities. At the same time, he fully admits that the wells dug by that gentleman have effected great benefit. In point of fact, he believes that in a very damp region, like that of the Western Ghauts, spleen and fever cannot be effectually combated, except by warm, substantial houses, and warm clothing. Change of site may possibly be advisable in some very few instances, but that alone would never be sufficient. The sites of villages have generally been judiciously taken up by the Natives of this country, and great difficulty would be found in procuring any change, even if such were found advisable. Circumstances, however, may certainly occur, in which a change of site may be advisable and practicable; and of these the Collectors will doubtless take due notice.

26. It must, however, be admitted that village wells, used for drinking water, ought to be carefully kept from impurity, whether arising from bathing the person, washing clothes, vessels, or noxious matter, vegetable or otherwise. The only question is whether the Collector, as Magistrate, has by law the power of enforcing public cleanliness in this respect. Mr. Bell, the Acting Collector of Ahmednuggur, having proposed the issue of a notification for the promotion of the object in view, the Acting Revenue

Commissioner applied to him for his opinion whether Regulation XII. Section XIX. of 1827, and Act XXI. of 1841, do not empower a Magistrate to enforce the removal from a tank, well, or pool, of any noxious and offensive matter. Mr. Bell's reply is, that although the enactments referred to would justify the infliction of a fine upon any individual who might place offensive matter in a public well, they do not apply to the nuisances created by the operation of natural causes; and there is no person upon whom rests the legal responsibility of counteracting the effects of such causes.

27. It appears evident, however, that a Magistrate can, under the above laws, prevent washing and bathing at certain public wells, used for drinking water, and at certain spots in rivers and tanks; and this he ought to do.

28. And the Acting Revenue Commissioner is of opinion that the same authority (Section II. Act XXI. of 1841) which enables a Magistrate to compel a community to fence a well or tank, to prevent danger arising therefrom, ought to empower him to remove rubbish, and mud, and vegetable matter from them, with the same object.

29. Wherever Act XXVI. of 1850 is in force, no difficulty whatever will be felt in promoting the object aimed at by Mr. Bettington.

30. The Acting Revenue Commissioner considers that a notification of the kind proposed by Mr. Bell would be beneficial only if a Collector can enforce its provisions; and under the opinion which he holds, he would have no hesitation in issuing one of a somewhat more stringent nature, and resembling that suggested by Mr. Bettington.

(Signed) H. W. REEVES,
Acting Revenue Commissioner, S. D.

No. 203 of 1855.

TERRITORIAL DEPARTMENT, REVENUE.

MEMORANDUM.

In reply to the Government Memorandum No. 4231, of 13th September 1854, transmitting a copy of a Memorandum by Mr. Bettington, on the subject of the Water in Jungle Districts being the chief cause of fever in those districts, for opinion and report, the Collector of Sattara has the honour of stating that, while Collector of Dharwar, he submitted his opinion and report on this subject, and that he has nothing now to add to that report.

(Signed) J. N. ROSE,
Collector.

Sattara Collector's Office, Camp Poosasowlee, 22nd March 1855.

No. 2583 OF 1855.

TERRITORIAL DEPARTMENT, REVENUE.

Revenue Commissioner's Office, Poona, 19th July 1855.

In reply to the above,* the Revenue Commissioner begs to lay before

Ahmedabad.—No. 644, dated 11th November 1854.

Kaira.—No. 482, dated 29th December 1854.

Broach.—No. 40, dated 17th January 1855.

Surat.—No. 377, dated 26th May 1855.

Tanna.—No. 850, dated 25th April 1855.

Khandeish.—No. 1154, dated 12th July 1855.

Government the reports of the Collectors of this Division, as per margin. It will be observed that none of the Collectors fully subscribe to the opinion of Mr. Bettington, that bad water is the only or principal cause of the prevalence of fever in jungle districts. The instances adduced to the contrary by the Collector of Khandeish are very strongly in point. Bad water, however, will un-

doubtedly produce a diseased state of the body, which must necessarily tend to make fever, when it supervenes, more malignant and fatal.

2. The measures proposed by Mr. Bettington would, the Revenue Commissioner thinks, be beneficial in many localities; but he would suggest that the opinion of the Medical Board be taken on the subject.

(Signed) E. G. FAWCETT,
Revenue Commissioner, N. D.

No. 644 OF 1854.

Ahmedabad, Collector's Office, 11th November 1854.

In reply to the above, the Acting Collector of Ahmedabad has the honour

Mr. Ritchie, Acting First Assistant; Mr. Ravenscroft, Acting Second Assistant; Mr. Jordan, Hoozoor Deputy Collector; and Dr. Larkins, Civil Surgeon.

to report that he has received replies from the officers named in the margin, to whom references were made, requesting their opinion whether the fevers that annually prevail in certain localities in the districts of this Collectorate with which they are acquainted are attributable to the impure and unwholesome water from tanks and wells, or to malaria and other causes; and if so, to state their views as to the suggestion offered by Mr. Bettington.

2. Mr. Ritchie, Acting First Assistant, states that he has instituted inquiries, and is inclined to doubt the applicability of Mr. Bettington's views

* Government Reference No. 4232, dated the 13th September 1854, forwarding a copy of Mr. Bettington's Memorandum for the opinion of the Collectors of the Northern Division, on the suggestions therein contained.

of the sources of jungle fever to the districts under his charge: that fever is only found to prevail in certain localities, from about the period of the closing of the monsoon to the setting in of the cold season; that the tanks generally contain little else than rain-water, and that, with the exception of the larger rivers, all streams dry up in the hot weather; that there are no forests in the districts under his charge, and that the wells are for the most part in open ground, away from trees, &c.

3. Mr. Ritchie would therefore ascribe the prevalence of fever rather to malaria arising from the rank and luxuriant vegetation that springs up during the rains, and reaches maturity during the period that intervenes between the closing of the monsoon and the setting in of the cold season: and observes that it is a well known fact that Europeans, who may be necessitated to travel during the season he refers to, through some parts of the country, are almost invariably attacked with fever, though they may not drink at all of the water, or confine themselves to the use of the purest spring-water.

4. Mr. Ravenscroft, Acting Second Assistant, in charge of Duskrobie and Jeytulpoor, states that from inquiries he has instituted he learns that the general impression is, that fever is caused by miasma and corrupting vegetation, and not by badness of water.

5. Mr. Jordan, Hoozoor Deputy Collector, who is well acquainted with this and other parts of Guzerat, would attribute the prevalence of fevers to the decomposition of vegetation in the months of September and October, when the night dews are heavy, and the sun, during the mornings, very penetrating. He considers that Mr. Bettington's remarks are more applicable to the Attaveesee District of the Surat Collectorate, where streams flowing from the mountains and forests in the interior are met with, and the supposed aborigines of the country, and the poorer classes, have an emaciated appearance, which he was informed was the effect produced by the endemic influence of the water in these streams, &c., of which the people are in the habit of drinking.

6. The fevers that prevail in the villages along the banks of the Kharee Mr. Jordan thinks is caused by the large pools of stagnant water which are kept for purposes of irrigation while the rice crops are on the ground, and afterwards for the cattle, when the stream of the Kharee river stops flowing; the decomposition of the weeds, creepers, and aquatic plants growing therein engenders malaria, and in this way fever is caused.

7. Dr. Larkins, Civil Surgeon, states that, after nine years' experience in Guzerat, he has seen nothing that could satisfy his mind that bad water is the cause of the disease; that he believes that it arises from no single cause; and that while content to attribute it to the somewhat vague term of malaria, we have omitted to take into account certain electrical conditions of atmosphere, as vicissitude of temperature, and the sudden setting in and prevalence of particular winds,—exposure to the direct rays of the sun being often a potent cause of fever.

8. To the above, the Acting Collector has only to add that he concurs generally in the opinions and observations above noticed, as regards the endemic causes of fever in this part of the province ; while at the same time he considers that the suggestions offered by Mr. Bettington, though not generally applicable to the districts of this Collectorate, might be adopted and acted upon with advantage in a sanitary point of view, wherever the water in wells and tanks may be considered unwholesome, and found on inquiry to be in the state described by Mr. Bettington.

(Signed) J. W. HADDOY,
Acting Collector.

No. 482 of 1854.

TERRITORIAL DEPARTMENT, REVENUE.

Kaira Collector's Camp, Neriad, 29th December 1854.

The question submitted for opinion is one upon which physicians are the most competent to advise : at the same time, it cannot be doubted that the greater prevalence and severity of jungle fever, in tracts of dense forests, and on the borders thereof, may be attributed both to the corruption of the air and water, by the presence of an excess of vegetable matter undergoing decomposition in these elements, producing carbonic acid gas ; and whether this be inhaled by the lungs, or taken into the system when water is drank, the effect is the same,—either cause will produce fever.

2. Instead of drinking such water found on the surface, if it be filtered through the soil till collected in wells, as Mr. Bettington proposes (by which the grosser particles of vegetable matter may be excluded), some mitigation of the evil (the liability to fever) may be obtained ; but the filtering process will not cause a chemical change in the constituent portions of the water.

3. Colonel Outram, I am told, used to take pure water with him when he conducted military expeditions into the Dang forests of Khandeish, to coerce predatory or turbulent Bheel tribes ; but it did not prevent those who drank it from catching jungle fever.

4. Opening and ventilating jungles, the removal of vegetable matter in excess, from land or water, can alone restore the salubrity of a district : the Collector is therefore of opinion that the building of wells, as suggested by Mr. Bettington, may have a mitigating effect, but, generally, is not sufficient of itself to avert or remove fever produced by combined causes.

(Signed) ALEX. ELPHINSTON,
Collector.

No. 40 OF 1855.

Broach Collector's Office, Camp Ahmode, 17th January 1855.

The Collector of Broach has the honour to state that there are no dense jungles in the Zillah of which he has charge, and the months in which fever for the most part prevails are those of Baderwa and Asho (September and October), when it is not very likely that the disease is occasioned by the badness of the water alone.

With reference to the remark made in the 3rd paragraph of the Report of the Collector of Kaira, the Collector of Broach thinks it as well to mention that he happened to have a conversation with Colonel Outram on the subject of the fever which is contracted in the Dang jungles of Khandeish, a few months ago, and Colonel Outram then expressed an opinion that the said fever is caused by some kind of poison which is *inhaled* into the stomach, and which almost invariably takes effect in about fourteen days after it is so inhaled. Colonel Outram also expressed an opinion that the danger might be avoided by using a covering for the mouth; and the Collector thinks that he understood Colonel Outram to say that he himself escaped the fever by that means, while all the other officers who accompanied him, and who failed to use any precautionary measures, were attacked with it.

In conclusion, however, the Collector of Broach begs respectfully to state that he thinks it extremely probable that Mr. Bettington is right, and that there may be many places in the Southern Mahratta Country, and elsewhere, in which the endemic fevers may be attributable, either partly or entirely, to the water having been corrupted in the manner described by him; and where this is supposed to be the case, the Collector thinks that there is no doubt that the suggestions offered by Mr. Bettington may be acted upon with the greatest advantage.

(Signed) E. L. JENKINS,
Collector.

No. 377 OF 1855.

TERRITORIAL DEPARTMENT, REVENUE.

From H. LIDDELL, Esq., Collector of Surat,

To E. G. FAWCETT, Esq., Revenue Commissioner, N. D., Poona.

Surat Collector's Camp, Teethul, Bulsar District, 26th May 1855.

SIR,—With reference to your Circular Memorandum No. 2257, dated the 16th September last, with accompaniments, relative to water in jungle districts,

I have the honour to report that the only Talookas where dense jungles actually exist in this Collectorate are six, viz. Mandvee, Koorsud, Walore, Chiklee, Bugwara, and Parnera. The people residing in these jungles, and on their borders, suffer generally from fever and other diseases, which are partially attributed to the water becoming bad by plants, leaves of trees, and other vegetable substances undergoing decomposition in it. I am not, however, prepared to admit that the use of bad water is the only cause of the unhealthiness of a district: there are other more weighty causes which tend to produce the evil, such as the well known malaria, which always exists in the neighbourhood of dense jungles.

2. I however consider Mr. Bettington's suggestions as to the clearing of the old and neglected wells of the jungles, and constructing new ones in well selected places, on the plain, to be sound and judicious, as tending in no small degree to the healthiness of the districts.

3. I would therefore beg to propose that I may be permitted to cut down all trees, plants, &c. which have grown on or near the parapets of wells and tanks, on the banks of streams and nullas, and also to take out mud and rubbish which may have accumulated there, the waters of which are used by the inhabitants of any of the abovementioned six districts. Should this plan be once adopted, and the Mamlutdars be then strictly ordered to cause all plants which may subsequently grow therein to be cut down annually, and to furnish returns of the nature indicated by Mr. Bettington every year before the setting in of the monsoon, I anticipate that some change for the better will take place in the health of these districts.

4. In conclusion I beg to suggest, that as Dr. Gibson is well acquainted with the Dang and other jungles bordering on this Collectorate, and being, moreover, a medical man, that he be called upon for his opinion on this subject.

I have the honour to be, &c.

(Signed) H. LIDDELL,
Collector.

No. 850 OF 1855.

REPORT OF THE COLLECTOR OF TANNA.

Tanna Collector's Office, 25th April 1855.

I have the honour to observe that the facts stated by Mr. Bettington of the good effects of digging wells, and thus obtaining a supply of spring-water, show indisputably that in some localities fever can be averted by these means.

2. There would seem, however, to be very good reason for doubting whether in most places the water is the principal cause, or even one of the

causes, productive of endemic illness. In many jungle districts, fever is neither prevalent, nor even very common, from February to August, and during a great part of this period the water is worse in quality than at any other time of the year. In some of the most unhealthy districts, the inhabitants drink nothing but river-water, and if using it were the cause of fever, all the villages on its banks would suffer equally; but such is not the case: in some villages, for instance in the open plains of the Nerbudda and Taptee Valleys, fever is never particularly prevalent, whilst in other villages in jungly parts of the same river, I have known half the inhabitants ill with fever at the same time.

3. With respect to the closing paragraphs of Mr. Bettington's Report, I have the honour to observe that I have over and over again been unable to persuade villagers to undertake any trouble or expense in cleaning out their own tanks and wells. I agree entirely with Mr. Bettington, that very frequently neither the people nor the heads of villages will trouble themselves about such matters, *unless compelled thereto*; but the Collector and Magistrate has no power of compelling them to work, even for their own advantage.

(Signed) G. B. SETON KARR,
Collector.

No. 1154 OF 1855.

FROM S. MANSFIELD, Esq., Collector of Khandeish,

TO E. G. FAWCETT, Esq., Revenue Commissioner, N. D., Poona.

Khandeish Collector's Office, Dhoolia, 12th July 1855.

SIR,—I do myself the honour to acknowledge the receipt of your Circular Memorandum No. 2257, dated 16th September 1854, forwarding a Memorandum from Mr. Bettington on the subject of water in the jungles producing fever and sickness, and suggesting certain precautionary measures.

2. I circulated a translation of Mr. Bettington's Memorandum to the Deputy Collectors in Khandeish for their opinion, and they generally concurred in the views of that gentleman, that bad water in the jungles is one of the chief causes of sickness and fever. The question is one I feel little competent to give an opinion on; but as far as my experience goes, I should say, that though to drink bad water filled with vegetable deposits must be extremely injurious in its consequences, and must contribute to the general unhealthiness of a district, yet it is not the principal cause, nor would the salubrity of a locality, in the majority of instances, be much improved if good water were substituted.

3. Certain portions of the Baglan, Pimpulnair, Nundoorbar, and Sooltanpoor Talookas are extremely unhealthy, and in certain seasons are not only

fatal to Europeans, but to Natives of other parts of Khandeish. These districts are generally waste, or covered with jungle : out of the whole arable land, not more than ten or twelve per cent. is under cultivation. Nowapoor, the station of the Mahalkuree of the Pimpulnair Talooka, is the most deadly climate. It is situated not very far from the top of the Western Ghauts, and the district for the most part is covered with jungle. A river flows by the town, and the water is considered to be particularly bad, and impregnated with vegetable deposits, and the inhabitants have sunk several wells, the water of which they exclusively drink. The health of the community is, however, very bad, and the people suffer dreadfully from fever and spleen;—a very few individuals reach an advanced age. There is a Mahalkuree's Kutcherry at Nowapoor, and all the Government servants belonging to it use the well-water, but still they fall sick after a few months, and, if not removed, contract the seeds of disease, which sooner or later carries them to the grave.

4. The town of Pimpulnair is, next to Nowapoor, the most unhealthy locality in which there is a district Kutcherry ; but it possesses most excellent spring-water, which has a good reputation all over Khandeish. The general Native opinion is that a district is healthy or otherwise according as it is waste or cultivated ; and in support of this, numerous instances are cited by them, which show that the salubrity of tracts of country has improved as cultivation has extended, and *vice versâ*.

5. People who can recollect the Dhoolia Talooka forty years ago, say that it was then as unhealthy as Baglan ; and now, though not an agreeable climate, it is just as healthy as the best parts of Khandeish ; and there is no doubt the climate of the whole province has very much improved, while, in some few cases, districts which were formerly highly cultivated, and supported large populations, have gradually become waste, and deteriorated very much in climate.

6. I may mention the instance of Pankheira, formerly a very populous Kusba, with thirteen Paras or hamlets, and now there are only half a dozen inhabitants left : this town was considered formerly as healthy as any other part of the district, and now it is quite the reverse.

7. In Khandeish there are whole districts, as the Pal Tuppa, Doula Turuf, Amba Purgunna, &c. entirely waste. The remains of temples, wells, and mango topes, prove that at one time they supported a dense population ; and now the climate is so deadly that nobody can live in them but a few Bheels. Several efforts have been made by the local authorities to induce people to settle in them by advances of Tuggai, and grants of land free of assessment for twenty years ; but all such efforts have resulted in failure, owing to the havock made by the climate, which, after destroying the larger number of those who had been tempted to settle in them, compelled the remainder to abandon them altogether.

8. After an attentive consideration of what I have been able to ascertain

regarding the past and present climate of Khandeish, and other Collectorates of the Bombay Presidency in which I have served, I am inclined to think that if a district is waste, and covered with jungle, nothing but removing the jungle, and bringing the land under cultivation, will improve the climate ; and should the water of its rivers and nullas be impregnated with vegetable deposits, and, consequently, deleterious to the health of the inhabitants, and good water be supplied from wells, no sensible improvement in the general health of the community would be observable as long as the whole country was infected with malaria, produced by decayed vegetation ; and the correctness of this opinion is confirmed by the fact of no country which is in a high state of cultivation being considered by the Natives unhealthy, though there may be many localities in them where the reputation of the water is far from good.

9. There may be exceptional cases, in which the unhealthiness of the locality is entirely owing to the water ; and Kookurmoonda, in the Sooltanpoor Talooka of this Zillah, is a case in point. The unhealthiness of that town is ascribed by the inhabitants to their being compelled during the rains to drink the water of a nulla, which takes its rise in the Satpoora Hills, and is filled with vegetable deposit. This was reported to you in my letter No. 2048, dated 9th December 1854, and on my recommendation the Kutcherry was removed to Taloda.

10. I cannot, therefore, concur in Mr. Bettington's opinion, that bad water is the principal cause of the unhealthiness of certain districts, and that if fine water was supplied, unhealthiness would cease to exist.

I have the honour to be, &c.

(Signed) S. MANSFIELD,
Collector.

No. 3889 OF 1855.

TERRITORIAL DEPARTMENT, REVENUE.

Copy of the Resolution passed by Government under date 14th September*

Letter from Secretary to the Medical Board, No. 2107, dated the 18th September 1854.

Letter from the Conservator of Forests, No. 1070, dated the 20th November 1854.

Memorandum from the Acting Revenue Commissioner S. D., No. 3836, dated the 7th December 1854.

Memorandum from the Collector of Sattara, No. 203, dated the 22nd March 1855.

Memorandum from the Revenue Commissioner, N. D., No. 2583, dated the 19th July 1855, with accompaniments.

1855, on the papers noted in the margin, being Reports relative to a representation made by Mr. Bettington of the evil effects produced on the Health of the Population of Jungle Districts, by the bad Water which they drink,

and to the measures suggested by that Officer with a view of securing to Villages a supply of pure Well-water.

From the information now before Government, there would appear to be ample ground for the opinion that the use of water impregnated with decayed vegetable matter has a very prejudicial effect on the health.

2. The Revenue Commissioners Northern Division and Southern Division may be instructed to direct the Collectors in their several charges to issue orders to their subordinate officers to institute inquiries as to villages, more especially in Jungly Districts, dependent on streams or tanks for drinking water, with the view of supplying, when practicable, the want of pure well-water at such villages.

3. With reference to Mr. Bettington's suggestions, at the end of his Memorandum, His Lordship in Council is of opinion that it will be sufficient to direct the wells to be cleared out before the monsoon, leaving it to the discretion of the local officers to remove any rank vegetation around them, which is likely to affect the purity of the water they contain.

(Signed) H. YOUNG,
Officiating Chief Secretary to Government.

* Communicated to the two Revenue Commissioners, as also to the Conservator of Forests, Medical Board, and Mr. Bettington.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. XXI.—New Series.

OFFICIAL CORRESPONDENCE

RELATIVE TO THE

**ASSESSMENT OF THE OMERCOTE AND
NARRA DISTRICTS, IN SIND;**

AND

**STATISTICAL RETURNS OF THE PROVINCE OF SIND,
FOR THE YEAR 1853-54.**



B o m b a y :

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1855.

CONTENTS.

	PAGE
Letter No. 62, dated 12th February 1855, from Mr. Frere, Commissioner in Sind, to Government, containing his observations regarding the Assessment of the Omercote and Narra Districts.....	1
Enclosure No. I. to Mr. Frere's letter, being an abstract of the correspondence on the records of the Sind Commissioner's Office relating to Omercote	10
Enclosure No. II. to Mr. Frere's letter, being a Memorandum, No. 201, dated 19th January 1855, addressed by him to the Collector of Hyderabad, regarding the Assessment of the Desert lands of Omercote, &c....	33
Enclosure No. III. to Mr. Frere's letter, being a Memorandum, No. 254, dated 23rd January 1855, addressed by him to the Collector of Hyderabad, on the Assessment of the Narra Talooka	36
Memorandum by Lieutenant Fife, Engineers, on the Narra Flood of 1854.	39
Remarks by Lient. Colonel Turner, Superintending Engineer in Sind, dated 9th February 1855, on Mr. Frere's Memorandum No. 254, dated 23rd January 1855.....	40
Memorandum from Mr. Frere, Commissioner in Sind, No. 119, dated 23rd March 1855, submitting a Statement from the Collector of Hyderabad, showing the Annual Revenue of the Omercote, Shahgur, and Narra Districts, from the Conquest up to the year 1853-54.....	41
Resolution of Government, No. 1955, passed under date 10th May 1855, on the above papers.....	42
Letter No. 110, dated 19th March 1855, from Mr. Frere, Commissioner in Sind, forwarding papers containing Statistical Returns of that Province for the year 1853-54.....	43

Letter No. 117, dated 2nd March 1855, from Mr. P. M. Dalzell, Deputy Collector of Customs, Kurrachee, to the address of Mr. Frere, Commissioner in Sind, forwarding a Memorandum of the cultivation, produce, consumption, population, &c. &c. of the Province of Sind, for the year 1853-54.....	44
Table showing the whole, and the cultivated areas of each of the Collectorates in Sind, together with their population, consumption, &c.....	50
Statement showing the quantity of land under cultivation, and the extent of all produce yielded in each of the Collectorates in Sind; also the import and export of similar produce by sea and land, and the balance consumed in the Province for the year 1853-54.....	51, 52
Resolution of Government, No. 1843 of 1855, passed under date 3rd May 1855, on the preceding papers.	53
Letter No. 1844, dated 3rd May 1855, addressed by Government to Mr. Frere, Commissioner in Sind, forwarding to him copy of the above Resolution.....	53

ASSESSMENT OF THE OMERCOTE AND NARRA DISTRICTS.

No. 62 of 1855.

TERRITORIAL DEPARTMENT,
REVENUE.

FROM THE COMMISSIONER IN SIND,

TO THE RIGHT HONORABLE LORD ELPHINSTONE, G.C.H.,
Governor and President in Council, Bombay.

Dated 12th February 1855.

MY LORD,

See page 3 of Selection No. XVIII.
(New Series).

Enclosures Nos. 2 and 3 :

No. 201, of the 19th January,
relative to the Assessment of the
Omercote Desert.

No. 254, of the 23rd January,
relative to the Assessment of the
Narra.

In reference to my letter noted in the margin, I have the honour to forward copies of two Memoranda addressed to the Collector of Hyderabad, regarding the Assessment of the Omercote and Narra districts, the relative positions of which are shown in the annexed rough Sketch.

I.—OMERCOTE.

2. The Omercote desert is bounded to the west by the level plain of the Narra, and the Meerpoor and Jooda districts of Sind ; to the north by a strip of desert under the Narra Kardarate, which separates it from Meer Ali Morad's desert district of Aradeen ; to the east by Jodhpoor ; and to the south by the Thurr. It is between 60 and 70 miles in length east and west, and between 50 and 60 in width from north to south : is composed of sandhills and sandy undulating ground, occasionally interspersed with patches of level ground very rarely exceeding half a mile in diameter. On its western border it rises, like land from the sea, to a general height of from 50 to 100 feet above the dead level of the plain of Sind, and some of the highest sandhills may be 100
b†

feet more. They are not so high nor so regular, nor so well clothed with grass and brushwood as the sandhills of the Thurr to the south, nor so loose and bare as those of the desert further north, the difference being partly due to original formation and partly to the comparative scarcity of rain as you go north from the border of the Runn of Kutch.

3. Except on the border towards Sind, the water is everywhere deep and generally brackish. 40 fathoms is a common depth for the wells ; 60 (I am told) not at all unusual to the east and north.

4. Omercote, and Guddra on the Jodhpoor frontier, are the principal towns, with traders' shops and houses of unbaked bricks. At Cheylar and a few other places there are several Banians' shops and a considerable number of houses ; but, with very few exceptions, all are of the ordinary desert pattern and materials, viz. a beehive-shaped wigwam, composed of a framework of boughs and sticks, with a thick covering of twigs and grass.

5. The whole population was returned last March at 20,488 souls, inhabiting 5,045 houses. This is probably under the mark, as the season had been a bad one for grazing, and, at the time the census was taken, numbers of the able-bodied male population especially were absent with their flocks and herds, driven to other districts to graze.

6. With the exception of a few Syuds, Beloochees, and other Sindians in the western villages, the upper classes are mostly Soda Rajpoots, who conquered the country from the Somras about 350 years ago, and were themselves subdued by the Kulloras of Sind about a century since ; from which time, with a brief interval of Jodhpoor supremacy, the district has been subject to Sind.

7. The Rana of Omercote is regarded as head of the tribe, numbers of which are found, generally as Thakoors, Patels, and superior Zemindars, in almost every village as far north as the Aradeen boundary, and south as far as Nuggur Parkur. They always claim to be Zemindars, or lords of the soil.

8. The Sodas have many of the good qualities and most of the failings of the Rajpoots, among the superior tribes of which race they are, I believe, numbered. Their most remarkable social characteristic is their custom of giving their daughters in marriage to other tribes and even other races. In many of the households of the Meers they had, as among the Jarrejas, their brother Rajpoots in Kutch, the position of Georgians or Circassians in Turkey, and more than one Belooch Sirdar has introduced to me a Soda Chief as his brother-in-law.

9. Among the trading classes, besides the usual Banian tribes of Sind, one or two classes of Bramins and Krar and other Marwar tribes of Banians are found.

10. The population of the most important are Bhads or Kothas, and Magwas, a class of nomads and pastoralists between the Dhar of Marwar and the Ghazibars of India, and generally remarkable for their independent habits and industry.

11. The dress, manners, and speech of all classes bespeak their proximity to, and constant intercourse with, Marwar.

12. The people live principally on the produce of their flocks and herds. There is generally some rain, which speedily produces a crop of excellent sweet grass, and, even in dry seasons, many of the shrubs afford excellent browsing for sheep, goats, and camels: the latter are of celebrated breeds, and command high prices in all the neighbouring provinces. Horned cattle of a very good description are reared in great quantities, and find a market as far south as Ahmedabad.

13. The fields,* which now form the only subject of taxation by Government, are generally the level bottoms between sandhills, where the water lodges, and where there is usually a small quantity of vegetable or alluvial soil. Even the sand, however, gives good crops of Bajree in situations where water lodges when rain is abundant.

14. No fallows are required, and though the rain, and consequently the crop, is uncertain, the site of cultivation is not subject to constant change, as on most lands in Sind.

15. Lightly taxed and very little interfered with, the people might have been expected to be prosperous and contented; but the reverse was the case to a degree very striking to any one who came, as I did, from the orderly and contented districts of Tharr and Parkur.

16. Complaint and discontent met me even before I crossed the frontier, and did not decrease as I proceeded onwards.

17. The cause of this was not difficult to discover, when the details of the previous history of our rule in this district became known.

18. An abstract of the correspondence on the records relating to Omarsote will be forwarded hereafter;† in the meantime the following summary may suffice.

19. For some years after the Conquest little notice appears to have been taken of Omarsote, which formed part of the Deputy Collectorate of Meerpoor. The Revenue Officer seems to have visited the district, and the forts of Omarsote, Chaylar, Chachra, and Kodes being at first held by detachments from Dera, what little might have been learned from the Officers in command was not made known to the Authorities in Sind.

20. Meanwhile the inhabitants were subjected to various general measures, which, even when in themselves just and necessary, were not always very

palatable to the Sodas, who, under the Ameeris, appear to have managed to keep a considerable share of local power in their hands.

21. Among such measures may be mentioned the general abolition of all the emoluments in fields and rent-free lands formerly enjoyed by Patels and heads of villages, and of a cess of considerable amount which the Sodas levied on the marriages of Hindoos, and which was valued, not only as a source of income, but as one of the few relics of their ancient sovereign power. The Chiefs were also deprived of their arms, though they belonged to the class which, by the late Governor's proclamation, was allowed to carry arms as a mark of rank, and as a reward for prompt submission to the British Government; and their treatment was in no respect better than that received by the ordinary Zemindars elsewhere.

22. In 1846 the discontent became so general, that several influential persons left their homes as avowed outlaws. Not only were cattle carried off by bands of armed robbers, but persons were kidnapped and held to ransom. One such outrage was perpetrated on the person of a Banian and his wife, who were carried off from their house at Cheylar, within a few hundred yards of the fort, garrisoned by a detachment of Native Infantry, the Native Officer commanding which declined to move out his men in pursuit. The district was reported by the Deputy Collector of Meerpoor and Collector of Hyderabad to be in rebellion; troops were asked for; and the offer of a reward of Rs. 1,000 for Rutton Soda, one of the principal offenders, dead or alive, was sanctioned among other means of restoring peace.

23. This man was ultimately induced to come in, and was not only forgiven, but considerable concessions were made to him and his tribe, pensions to the amount of Rs. 700 per annum being assigned to the Chiefs in lieu of the marriage fees.

24. The concessions were, however, much less valuable in amount, and were made in a very different spirit from those spontaneously granted, at Colonel Roberts' suggestion, on the first introduction of our rule in the Thurr and Parkur districts, and they consequently never had the same effect of rendering the people grateful or contented.

25. Quiet was, however, restored; a light rate of Buttai was introduced; and there has been no subsequent attempt to disturb the peace.

* Amount of lease from 1850-51 to 1853-54, Rs. 6,389. 26. In 1850 the district was leased out like the rest of the Collectorate, the leaseholders being the principal Soda Zemindars.

27. The settlement was fixed on a light average of former years; the seasons were favourable, rain being abundant; and there was little in the shape of complaint or otherwise heard of in the district.

28. The leaseholders generally collected from their sub-tenants in kind;

from others in cash, at the rate of Rs. 3 on a cultivated field, and Rs. 1 from every field prepared for cultivation but not sown.

29. The lease terminated last year; and here, as elsewhere, the want of any useful record beyond the gross amount of collections, whereby to guide future proceedings, was severely felt.

30. Nor was much information to be got from other sources. The district had been rarely visited. It was separated from Meerpoor by 40 miles of level, hard, alluvial soil like the NW. desert, locally called "Put," and till the Narra came down and overflowed the plain, there was hardly a well, a field, a permanent habitation, or sign of human life to be seen the whole way. Meerpoor itself was considered a remote and desert spot, so that it is hardly to be wondered at that Omercote, 40 miles further and in the desert itself, was regarded almost as a *terra incognita*.

31. The most intelligent people at Omercote itself could only reckon up eight visits from European Civil Officers, of which only two were from the Collector, in eleven years. Few, if any, of the villages in the interior of the desert, I was assured, had ever been visited till Lieutenants Tyrwhitt and Naylor went round them this year.

32. It is not surprising that the Native functionaries followed the same example, and that the Kardar, who had been four years in the district, knew little or nothing, from personal observation, of any place but Omercote.

33. The principal Soda Chiefs, believing that they might presume on the general ignorance and indifference regarding the district, declined to renew their lease on what were obviously reasonable terms. Lieutenant Tyrwhitt having unexpectedly visited the desert, and found that the season had been a very favourable one, declined to let them renew the lease on their own terms. A Syud of considerable influence and respectability, who had* been concerned in the management of the district under the Meers, came forward and took the lease for the year at Rs. 12,300, agreeing to collect in kind from all the cultivators, according to the local custom, of a third of the gross produce, as estimated by arbitrators, from the growing crops. When the Sodas found that this agreement had been concluded with him, they came forward and offered a considerably larger sum to retain the management in their own hands, but the agreement had already been closed with the Syud.

34. The system was not one which I should have approved of under ordinary circumstances; but I learned what had been done too late to apply any remedy this year. This is perhaps the less to be regretted, as the inquiries made by the leaseholder, and the discussions to which his assessments gave rise, have furnished data for estimating approximately the fair assessment of the district, regarding which there was previously no information of any practical value on record; and after a patient inquiry into all complaints on

the subject, I felt satisfied, that without over-assessing the people, he will not only reap a large profit, but that a much larger amount might have been demanded this season without exceeding the sum which Government has a right to expect. I may add that all the poorer cultivators, all, in fact, but the Soda Chiefs themselves, seemed better satisfied with the present year's arrangements than with any they had known before.

35. Leaving therefore unaltered the settlements of the current season, I endeavoured to lay down a plan for avoiding uncertainty and arbitrary settlements for the future, and, while securing all cultivators, including the poorest class, from over-assessment, to restore to the Chiefs and Patels that legitimate position and authority, the want of which is, I think, one capital defect of the system heretofore in force throughout Sind. After hearing what the principal Chiefs and others had to say as to the wishes of the cultivators and the practice of the neighbouring districts of the Thurr and Jodhpoor, the enclosed Memorandum of Instructions was drawn up, and I trust that the settlements which Lieutenant Tyrwhitt will effect, if not the best which local peculiarities will admit of, will be a considerable advance towards a settled and light system of Assessment. The details, as explained to both Chiefs and cultivators, appeared to give much satisfaction, and I have great reliance on the zeal, energy, and temper of Lieutenant Tyrwhitt, who is deservedly popular among all classes, and who will, I have no doubt, draw the Chiefs from the state of isolation and depression in which they have so long lived.

II.—THE NARRA TALOOKA.

36. Of the Narra district almost less was known than of Omercote. But a small portion even of its boundary is accurately ascertained.

37. It consists of two divisions, the "Registan" or desert, and the Narra "Put" or alluvial plain.

First.—The former is a portion of desert intervening between the Omercote desert and Meer Ali Morad's desert district of Aradeen, bounded on the west by the channel of the Narra, which separates it from the level plain of Sind, and on the east by Jodhpoor. The inhabitants of this portion apparently differ little from those of the Omercote desert, but I could not learn that any European Officer, or even any intelligent Native, had ever visited them.

Second.—The Put is a portion of the level alluvial plain of Sind, of an irregular triangular shape, one extremity of the base being towards Omercote, the other towards Meerpoor, and the apex near Mitrow. The Narra there issues from the sandhills, which, on the west bank, begin to recede gradually and bend away towards the south-west, disappearing after a few miles in the level plains of the Sukkurund Talooka, while those on the eastern bank, rising as before described more abruptly from the plain, bend to the south-east and

sweep round by Omercote in an unbroken line till they reach the Runn of Kutch.

38. The Narra, whose course as far as Mitrow has been nearly due south, preserves a general direction close to the eastern sandhills.

39. The stream may be best described as the drainage of the low lands on the left bank of the Indus from above Subzulcote to near Roree. The water, which accumulates only in very high inundations in these hollows, unable to return to the main channel of the river, finds an outlet through the sandhills about 20 miles south-east of Roree, and after flowing, as before described, in a nearly direct southerly channel among the sandhills to Mitrow, there emerges into the open alluvial plain.

40. To judge from tradition, the high inundations which enabled the water to reach so far down the channel of the Narra, have occurred at very irregular intervals of from eight to twenty years. Their occurrence appears to depend not only on the height of the inundation above Roree, but on the set of the current in the main river against its banks about Kusmore and Subzulcote.

41. These Narra floods have occurred in each of the three last hot seasons after an interval of many years. As no previous flood had come down during our occupancy of Sind, it is not surprising that very little was known about the country.

42. The alluvial plain from near Mitrow appears to the eye a dead level, but the portions nearest the sandhills of the eastern desert are rather lower than the rest of the plain, so that the flood waters naturally flow along the base of the eastern sandhills. Among these sandhills are depressions, often several miles in diameter, and sinking nearly as much below the general level of the alluvial plain as the sandhills rise above it.

43. Consequently, when the flood emerges from the sandhills and reaches the plain, with a general tendency to keep towards the sandhills, on arriving at one of these depressions (locally known as "Dhunds") it continues pouring in till the Dhund is filled and the surrounding sand thoroughly saturated, before it proceeds onwards in its south-easterly course skirting the edge of the desert. Chains of these Dhunds often communicate with each other, and their extent may be judged from the fact that some of them have been observed to absorb the whole flood, for a period of fifteen days, before the Dhund became sufficiently full to allow the flood to continue its onward passage.

44. When the waters overflow the plain to the westward, it soon dries up after the river subsides, and the flooded portion becomes fit for the Rubee (cold weather) cultivation. The beds of the Dhunds, too, become fit for cultivation as they dry up; but some of them are so deep, that they are said to have retained water during the longest known interval between any two

floods, and have consequently never been dry within the memory of the present generation.

45. The works designed by Lieutenant Fife, and now in course of execution, are in two distinct localities.

First.—A supply channel; thirteen miles in length, leaving the Indus close above the Town of Roree and communicating with the Narra just before it enters the sandhills. This is intended to obviate the uncertainty of the present floods, and to give an annual and certain supply of water to the channel, whatever may be the height of the inundation.

Second.—“Bunds” or dams are to be constructed at various spots, from near Mitrow southwards, across the necks of the channels leading into the principal Dhunds, so as to exclude from them the water of an ordinary flood, and to allow it to pursue its course undiminished by the waste which the Dhunds occasion.

46. The water thus excluded from the Dhunds naturally flows over the plain to the westward, and renders it fit for cultivation. It was owing to the completion, before last hot season, of two of the principal Bunds above Mitrow, that the flood, which would otherwise have been a very trifling one, spread itself out over the plain to a distance of 63 miles, crossing the high road from Meerpoor to Omercote.

47. The permanent inhabitants of this plain are very few. The most thriving are Sindees of the Hingora and Jooneja tribes, the latter giving their name to the Purgunna (Narra Joonejane), and many Belooch colonies, especially of the Murree tribe. The population is confined to a few small villages down the course of the Narra, and in other spots, few and far between, on the plain itself, where a permanent supply of water, often hardly drinkable by strangers, marks the site of a few huts. The inhabitants, unless greatly belied by their neighbours, generally unite the two professions of cattle breeders and cattle lifters. For the latter profession, their district, separating the grazing lands of the desert from the richly cultivated districts on the Indus, offers peculiar advantages. The level soil is singularly hard, and receives but a very faint impression from the foot, while the robber may travel for miles, in so thinly inhabited a country, without risk of meeting another human being.

48. When, however, the plain has been flooded, every one turns to cultivation, and strangers, whose homes are in the “Desert,” or in the Hydrabad districts nearer the river, flock to the spot with their ploughs and cattle. Banians, with donkey loads of seed-grain, are in attendance. As fast as the water dries up, the land is ploughed and sown with wheat and mustard seed. The fields, distinguished by boundary marks hardly to be recognized by any but the owner, are left with so few watchmen, that they appear to be entirely deserted, while the cultivators and their cattle proceed to plough and sow other spots, returning to their own homes when the sowing season is at an end.

Sometimes they carry off with them a bullock stolen from their neighbours : at other times one previously stolen from themselves, and now recognized and recovered among the cattle there assembled.

49. As the grain ripens, the cultivators reassemble to reap it and to take part in its division by Buttai, after which the plain is again deserted till the next flood comes down.

50. It is obvious that to such a locality and among such a population as I have described, where there are few permanent inhabitants and fewer still permanent boundary marks, the ordinary modes of Survey and Assessment can hardly be applied. When the floods become of annual recurrence, recognized boundaries and private property in the several divisions of land will of course spring up, and this process has already commenced ; but it is very desirable to anticipate this period, by laying out allotments of land at a time when regularity and uniformity can be secured without hardship. In a district where there are no ravines, mounds, remarkable trees, or other natural landmarks, it is necessary that all the boundaries should be artificial.

51. This may explain several of the rules in Memorandum No. 3, the necessity or practical utility of which, would, under ordinary circumstances, be hardly apparent. I am not positive that better rules may not be framed to meet the very peculiar circumstances of the Narra district and its cultivators. I can only say that those now submitted are the best which I could devise, after consultation with the Collector and his Deputy, and with the few cultivators on the spot who could imagine any mode of Assessment other than Buttai.

52. For the agency by which it is proposed to carry out these measures, I would beg to refer to my letter No. 63 of this day's date.*

I have the honour to be,

My Lord,

Your Lordship's most obedient Servant,

H. B. E. FRERE,

Commissioner.

Commissioner's Office, Camp Khyrpoor, 12th February 1855.

* P. S.—A Statement of the revenues of the Omercote and Narra districts for each year since the Conquest, will be forwarded hereafter.

The above letter was written before the events described in my letter No. 94, of the 8th instant, in the Political Department, occurred. The delay has been caused by references to fill up the Sketch Map, which is not yet complete, and will be forwarded hereafter.

H. B. E. FRERE,

Camp Shikarpoor, 9th March 1855.

Commissioner.

* See page 144 of Selection No. XVIII. (New Series).

No. 1.

Abstract of letter No. 72, dated 18th September 1843, from the Collector of Hyderabad to the then Commissioner in Sind, forwarding Extracts from a letter, dated 13th September 1843, from Lieutenant Forbes, Deputy Collector of Meerpoor.*

The Collector observed that—

“The suggestions regarding the measures to be adopted to put a stop to the evils now caused by Sepoys and Camp-followers in their marches, I beg most strongly to support, as being accordant with the rules on this subject, which have been found to work so well in India.

“In relation to the paragraphs concerning the Omercote Rajpoots, I am sorry to say that Lieutenant Forbes’ report only confirms those I have received from the other desert borders of the conduct of this tribe. They have taken advantage of the expulsion of the Ameers, the countenance of the Rao of Kutch, and the supposed British feeling in their favour, to emancipate themselves from all control.

“A party passed through here from Omercote the other day *en route* to wait on the Governor, with a letter from Captain Jackson, Superintendent of Mullanee, to which party Lieutenant Forbes particularly alludes; the persons composing it having been complained of by the Kardar of Omercote as people who would pay no dues. I explained to them that it was the intention of Government to take into consideration, at an early period, the interests of the desert tribes; that I had received instructions to proceed in the cold weather to the southern border, to meet the Political Agent of Kutch, with the view of effecting a settlement; that the disposition of Government was, I knew, most favourable, and that nothing could prevent a happy issue to their affairs but the foolish course they were now pursuing. I told them that till a law has been abrogated by authority, it must be obeyed; that however clearly we might see the hardships under which the Soda Rajpoots labour, and however willing we might be to redress them, this assumption of a right to dictate to Government, and, before troubling themselves about consulting it, throwing off at once all obedience to the laws and stopping payment of every authorised due, was what would tend little to bear out the view they were so anxious to impress us with, of being at once the most suffering and the most patient of men.

“They professed their readiness to attend to my advice, and promised to

* Captain Brown, Engineers. The appointment was afterwards changed to that of Secretary to the Sind Government.

write to their brethren and desire them to change their course of conduct, to wait patiently the decision of Government regarding their claims, and meantime to obey to the letter, as in the Ameers' time, all regulations now in force, however obnoxious they might be. This, it would appear, they have failed to do.

"While on this subject, at the risk of being tedious I would beg to offer a few observations regarding the rights these Soda Rajpoots lay claim to.

"The first is to have their lands given to them on more favourable terms than at present, paying such moderate rent on each pair of bullocks as is paid by the Rajpoots about Balmeer, instead of two-fifths of the produce as at present.

"The second is to be allowed a clear fifth of the taxes of Registan, a right which Shere Mahomed's father promised their tribe, and allowed for a few years after seizing on their country, but which he took an early opportunity of extinguishing.

"The third is to have the right restored of taxing, on the marriage of their daughters, Banians who live within the districts inhabited by their tribe, at the same rate as formerly. They once possessed a right on these occasions to levy a fee of twenty-eight rupees and a half from the bride's father, but Shere Mahomed reduced this, as far as they were concerned, by two rupees, which two he appropriated to himself.

"The fourth claim is, that as the Soda Rajpoots are the descendants of the ancient lords of the soil, they should (subject only to the first named payments) have all their feudal rights restored; be made subject only to their own Chiefs; and especially have the right to root out from the desert all tribes at enmity with themselves, particularly the Koshias, who, by their own account, are villains of the deepest dye.

"Their first request I would most cordially support. The desert is no place to look to for revenue; if we succeed in establishing order there, with a secure passage for merchandize to and from the countries beyond, we shall probably have reaped from it the best advantages it is capable of yielding. The uncertainty of the seasons there, and frequent failure of the crops, make it necessary that if cultivation is to be engaged in at all, it should be capable of being engaged in on easy terms; moreover, every additional acre brought under the plough is an additional guarantee of order, it will keep an additional plunderer from mischief. To establish habits of industry among such a population, therefore, too much could not be sacrificed, were sacrifice necessary; but in this instance, as in most others of a similar kind, I have little doubt that in a few years, the small amount of revenue at present sacrificed would be replaced many fold.

"With regard to the other three propositions, His Excellency will at once see the mischievous tendency of them. That part of the third, relating to the mode in which they purpose disposing of the other desert tribes, as soon as they have

secured their own footing firmly, did appear to me rich in the extreme. With regard to the apparently least objectionable of the three, I would observe, that of taxes and dues there are already far too many existing in Sind, and there are hundreds of persons ready to start forward on the first encouragement and lay claim to others, which have been for years abolished. At this moment therefore—at a time when we are doing everything in our power to remedy the evils which these numerous exactions have* inflicted—at a period when we are making every sacrifice ourselves, it does appear to me that it would be a most fatal policy to bring forward claimants to long dormant rights, and empower them to act anew those scenes which we are as fast as possible disconnecting ourselves with, and which we have promised the people shall soon be closed for ever. While our hands are unfettered, while we have little but our own dues to deal with, we shall be free to follow the path of regeneration not only unimpeded but heartily aided and cheered on by all. Once, on the other hand, encumbered ourselves with claims such as these, establish wheel within wheel, right within right, tax within tax, and our course will be closed up with stumbling blocks such as we never shall get over, and of which, having been placed there by ourselves, we shall never, without a breach of faith towards those in whom we have vested the interest, be able to attempt the removal.

“The third and fourth claims put in a clear light the real nature of these Chiefs. While crying out against oppression, their first demand is power to oppress. The fee of two rupees exacted by Shere Mahomed on the marriage of each Banian's daughter is monstrous, but, like the twenty-six and a half taken on the same account, it is the most proper tax in the world when levied by themselves. So perfectly carried away are they by their prejudices, that when I tried to convince them of the absurdity of their conduct, they gravely assured me the tax was most popular with the payers of it. On my suggesting, however, the obviously best arrangement in that case for all parties, the making it voluntary, I found the voluntary principle was expected to prove as poor a pocket-filler in this country as it is expected to be found at home.

“It was the same thing when I reprobated their designs towards the Koshias. These, by their account, were men of yesterday, interlopers and thieves, and had no right to elbow, in their own proper domains, these sons of the former kings !

“I know well, however, that His Excellency, who has long devoted himself to the consideration of the true principles which should actuate Governments, will never be persuaded to adopt this partial and one-sided plan of conferring plenty and happiness on Sind ; he will not allow the grievances and claims of these Rajpoots to blind him to the fact that the serfs of these Rajpoots have their grievances and claims and rights too ; he will see that there is a pauper population which has been and is now oppressed, as well as the Thakoors

who ruled it, and that its claims to relief, if less loudly expressed, may be even ten times better founded than those of the Chiefs who clamour at his gate. The acmé of oppression is, to be oppressed beyond the heart to complain.

“Our Government is not a Government for this class or for that class. We must show at starting that it will prove equally the father and protector of all; Koshias and Sodas must live in peace together; the serf and slave must have their interests attended to as well as their lords and masters; and if we find we have wolves to deal with as well as lambs, we must endeavour to change the nature of their appetite, not attempt to pacify them by letting them run riot in the fold. These Thakoors, however, enter little into this spirit; they can see nothing but justice in their own exactions, nothing but the greatest oppression in those under which they labour. The poor shepherds whom they swindled out of the money paid by Captain Jackson for supplies furnished, were rightly served; but taxes and dues of any kind to Government are extortions too monstrous for men of their rank to be made to submit to. The interests of the body of the people with them are nothing; all in this world worthy of consideration are the shares Sovereigns and Chiefs should have respectively in the common plunder. Like the lion’s fellow hunters in the fable, they feel deeply the injustice of the monarch in his division of the game; but they do not bestow a thought on the case of the poor brute whose carcass they would so equitably divide.”

Extracts from Lieutenant Forbes’ letter.

<p>“All classes between this and Meerpoor complain, and, as far as I can judge, not without reason, of the ill treatment they receive</p>	<p>Relating to Conduct of Troops marching between Omercote and Meerpoor.</p>	<p>from Sepoys and Camp-followers travelling this route.</p>
---	--	--

“The small village of Goloor, 26 miles on this side Meerpoor, I found entirely deserted on this account; the head man, a Syud, having moved with all his effects to within a short distance of Meerpoor.

“I would recommend that I should be made acquainted with the intended route and date of intended arrival in my district of all parties passing through it, *particularly if unaccompanied by an European Officer*. If this is done, I will send a Peon or one of the Mounted Police with them, making *him* answerable that nothing is either taken by force or without payment.

“I would also recommend that all Camp-followers should be furnished with certificates, to be shown either to me or to the Officer commanding the troops at Meerpoor, which will lead to their detection if any complaints are made against them.

“ I wish the Rajpoots would return with the General's answer. I had those here up to-day, and told them, that until I got other orders, the Kardar was to collect taxes, and that they had nothing to do with them. No taxes have been levied for the last three months and a half, and all owing to the interference of those who had nothing to do with it, and to the Kardar not acting up to his orders. *They are plain enough*, and he ought to have paid no attention to the *Rajpoots or any one else*.

“ The Rajpoots are all like so many Griffs on first coming out to India, talking about their rights, and trying all they can, in an underhand way, to prevent the taxes being collected. I don't see what we have to do with men's rights ; we ought to consider what is best for the country, and that this ought under us to be in time a very rich place I think there is little doubt ; whereas, under the Rajpoots, it will remain, as it is, almost a desert. Since I came here, I have had more complaints against the headman of this town than all the others put together. Jackson, on leaving this, very wisely took a receipt for the money he paid the Rajpoot Patel for supplies. He has kept all this himself, and the Bukreewallas, if I had not come here, would never have received a pice.”

To this the Secretary to the Sind Government replied, under date the 25th September 1843, No. 742:—

“ I am directed to inform you, that steps will be taken to prevent Sepoys and Camp-followers committing oppression on the villagers between Hyderabad and Meerpoor.

“ You will, pending further instructions, treat the Soda Rajpoots similarly to such other Chiefs of Sind as may have made their salams to His Excellency the Governor.”

The Collector of Hyderabad, on the 1st October 1846, No. 744, forwards No. 31, of the 17th September 1846. copy of a letter and enclosure from Lieutenant Forbes, Deputy Collector, Meerpoor, in reference to the robberies being committed at Omercote.

Lieutenant Forbes remarked that—

“ In forwarding copies of letters from the Kardar and Chiefs of Omercote, and copies of petitions from the Krar Banians received this day, I have the honour to inform you, that I have sent off a party of the Mounted Police to seize the Rana of Omercote and Chiefs Ankjee and Muljee (Sodas), with orders to detain them prisoners until my arrival, which will be on Monday morning the 21st at furthest. I am informed that the robbers named have crossed into the Jodhpoor territory, but in apprehending them I anticipate no difficulty,

provided the Rana of Omercote and abovenamed Chiefs, whose tools they undoubtedly are, are first secured.

“The tax referred to in the letter of the Rana and Chiefs is the one formerly levied by them on all marriages between persons of the Krar caste.

“As I expect that for some months it will be necessary to keep several parties of Mounted Police in the desert, I would beg strongly to recommend that permission should be given me to entertain, for service there, some 20 to 25 men, natives of the Registan, mounted on their camels. The long marches through deep heavy sand are most trying for horses; many die in consequence; and all return, after being there for any time on duty, in the worst condition.”

Enclosure to above, from the Kardar of Omercote, dated 17th September 1846.

“Informing of his arrival at Omercote. Forwarding the petition of Mania Banian. Informing that unless something was immediately done to put a stop to robberies, they will continue to be committed in the Town (of Omercote), as the relations of the robbers live at Omercote, and all the Sodas having agreed together, are robbing. If the relations of robbers are called upon to produce them, it will be done. The four camels formerly reported as having been stolen from Hurchund, Sutram, and Vishna (Banians) of Chachra, have lately, through the instrumentality of Shamoo Soda, been recovered on payment of a sum of money. The Sodas and Rajpoots of Omercote and its neighbourhood have an idea that by robbing, Government will in some way make a provision for them to induce them to discontinue the practice. That unless something is done, the poor will be very badly off, as others will join the robbers. That he had sent for Ranna, Mehraj, Muljee, and Akkeeraj (Sodas), Chiefs of Omercote, to consult with them on this subject, and forward their statement with that of the Krar Banians of Omercote.”

Enclosure to above, Petition of the Krar Banians of Omercote, dated 17th September 1846.

“Under an understanding with the whole of the Sodas, Rutton, Sumeera, Oomra (Sodas), and Dessur (Rajpoot) oppress us quiet Banians. In the middle of the day, in public, we are robbed when transacting business. These persons say they will make no exceptions. We (Banians) look up to Government alone for protection. The justice of the Government is known in every country; therefore we pray something may be done, or, with permission, we, the Banians of the Krar caste, will move from Omercote to some other place under the Sind Government. We alone are oppressed. It may be because they do not consider us subjects of the Government.”

Statement of Ranna, Mehraj, Muljee, Sakeeraj (Sodas), Chiefs of Omercote.

“Who are Rutton, Summada, and Oomra that they should dare to oppress the poor? Having from hunger given up all hopes of being able to live, they behave as they are doing. If Government will provide for them, they will be brought in, and the poor will not be sufferers, or if permission is given for the tax formerly levied on the Krars, after that, they, the Chiefs, will be answerable if these persons injure any one.”

Statement of Munia Krar, 17th September 1846.

“Complains of his having been robbed at Goour-ka-Thurr, Purgunna Gudra, by Rutton, Summada, Oonra (Sodas), and Dasseer (Rajpoot), of property and money to the value of Rs. 128, and that he called upon Omeda (Dyher) at the time for assistance, but received none.”

On the 3rd of the same month the Collector forwarded copies of a letter and report from the same Officer, relative to the Chief Ankjee, and solicited instructions.
Dated 29th September 1846.

Lieutenant Forbes wrote—

“You must recollect Ankjee, the brother of three of these Sodas who are robbing in this way. He is one of the principal Chiefs of Omercote. I think you remarked to me that you rather liked him.

“He is rather tall and thin, with a thin, rather short, white beard, and was always the spokesman of all parties of the Omercote Sodas that waited on you in Hyderabad.

“It will be much more difficult to apprehend these fellows than I at first thought it would. It is almost impossible to get any information about them. I am most anxious to hear whether I am to have permission to entertain some 20 men, mounted on their camels, as Police. I have not enough of mounted men to protect so large an extent of frontier, and besides, horsemen, if robbers have any start of them, are not of much use in the desert, through the heavy sand. Am I to follow this band up, when I can get on their track, wherever they go to? If not soon put down they will increase very much, as the ring-leaders are men of considerable influence. To effect this, I want some 20 Camel Sowars, and permission not to see the frontier, when I come to it in following them up, or when I hear of their whereabouts within some 50 miles across it.

“Is the boundary to be marked out this cold weather? There is a great deal of fever here. I have not had it as yet, but can't hope to escape. I am told the Krar Banians are now anxious to be allowed to pay the marriage tax as formerly to the Sodas. But that would never do, I should think. There is a report that the Banian referred to in the accompanying Report has been

released on payment of Rs. 120. He was taken to Hursanee in the Jodhpoor territory."

Report by Emam Khan (Barghier), Hydrabad Mounted Police, dated the 29th September 1846.

"About six days ago, when I was at Dunaseer, a village about 40 miles from this, to which place I had been sent to apprehend Ankjee (Thakoor) of Omercote, it was reported to me that Ankjee's brother, with four followers, all armed, had the night before entered the village of Jaghora, six miles from Dunaseer; and having taken up a Banian of the Krar caste, who was asleep on his cot, they carried him on it outside the village. When outside, they tied him on one of their camels and rode off. They also took away with them the horse of another Hindoo."

To this the Secretary to the Sind Government replied, under date the 5th October 1846, (No. 2589) as follows :—

"I have the honour, by direction, to inform you that His Excellency the Governor sanctions the entertainment of the 25 Camel Sowars recommended by Lieutenant Forbes, until sickness having abated in that direction, orders will be given for the detaching to Omercote of a party of the Sind Camel Corps."

"P. S.—Lieutenant Forbes is permitted, when pursuing the robbers he alludes to, to follow their tracks across the Sind frontier."

On the 13th idem (No. 786) the Collector forwarded an Extract from a letter from Lieutenant Forbes, Deputy Collector, Meerpoor, on the subject of the pursuit made after the Soda robbers of Omercote.

Extract.—"On the night of the 4th instant, the Sodas I have already reported as robbing all Banians of the Krar caste they can lay their hands on, entered the town of Chore, only ten miles from this, and carried off prisoner the son of the head Banian of that place, a boy of about seven or eight years of age, wounding with a sword, on the head, the father, who attempted a rescue. Information of this was brought to Omercote on the morning of the 5th, and Subedar Futteh Khan, with the whole of the Mounted Police then present (twelve swords), started in pursuit.

"The Subedar reached Chore about 8 o'clock A. M. and immediately took up the track of the robbers. At 2 o'clock P. M. on the 6th he was still on their track, having marched day and night, a distance of nearly 55 miles, through heavy sand and over sandhills. One horse had dropped from fatigue, his own, and three others were so done up that they could not carry their riders, who were obliged to mount on camels. The track is in the Jeysulmere direction."

On the 29th January 1847 (No. 71) the Collector forwarded copies of letters from the same Officer, and stated—

“The persons now in rebellion are members of the Omercote Soda family, who used in former days to levy a tax on every Banian of the Krar caste of 28 rupees on his marriage; these Banians they claimed the right to tax as serfs of their family for centuries. After the British took the country they came to me to enforce this tax, as it seems the Banians then considered themselves freed from this badge of slavery, while the Sodas not only wanted authority to levy this tax on the Krar Banians who might be residing in the desert, but wanted further permission to pursue and make all who might leave to settle in Allyarka, Tandra, Hydrabad, or elsewhere pay this tax likewise.

“My reply was that the Banians might make them what presents they liked, but that I considered this tax wholly inconsistent with the spirit of the Governor General’s proclamation abolishing slavery in Sind. They then went to complain to His Excellency, and some correspondence on the subject took place; but the matter somehow dropped, and I heard no more of it at that time.

“About a twelvemonth afterwards, a complaint was made to me of a Soda having forcibly levied from a Banian this tax. I sent for the parties and made the offender refund, and fined him besides. This put a stop to the matter some time. It has now, however, broken out in that form to make the settlement of the question by Government in some way or other necessary.

“I have only to add that I differ entirely, as to the course to be pursued in this matter, from the views of Lieutenant Forbes. It is as clear as daylight that the crimes perpetrated by the members of this tribe are not isolated crimes, with which the tribe generally has nothing to do, but that they are the deliberate deeds of a set of men who have no single purpose in the matter, but are breaking the law systematically, to compel Government to grant certain immunities to the tribe, while, by way of screening themselves as much as possible from the consequences of such conduct, they as systematically settle that certain members of the family are to remain well affected, to prevent the seizure of their flocks, their fields, and possessions, in short, generally their means of livelihood.

“Under these circumstances, I certainly do not think that 100 Sowars patrolling over the desert will do much towards arranging the affair; it is one to be settled not by apprehending individual delinquents, but with the heads of the Sodas in that district. They have given us an excellent practical lesson of what *with them* is held the most effectual plan of enforcing a demand, and I have no doubt it would be as inconvenient to them to be lodged in the Fort Hydrabad as it is for the Krar Banians to be carried away to their folda encampments. There is, moreover, I dare say, as much property

among the tribe, within reach of this Government, as will reimburse, if need be, all that has been taken or that is likely to be taken. In short, if the matter be treated as delinquency of the tribe, as it really is, and not as an affair with individuals, and if the Soda Chiefs be made clearly to understand this, I have no doubt that they will have sense enough to see they are playing a game wherein they must lose much more than they by any possibility can gain, and so will readily of themselves put matters right again. Compensation and a fine for what is past might, when they had once come to their senses, be sufficient, and there I trust the matter would end.

"Such, I would beg to submit, is my view of the case; however, as Lieutenant Forbes has called for troops, I have thought best to take no step whatever in the matter, but simply lay the case before you to be submitted to His Excellency."

Enclosure to above, from Lieutenant Forbes, dated 27th January 1847.

"You know Ankjee Soda of Omercote very well, the elder brother of Rutton and Oomra; he, it has just been reported to me, has left to join his brothers.

"I really wish you would get Sir Charles to send me some 100 Sowars of the Sind Irregular Horse at least, for outpost duty on the frontier.

"The trade of the poor Krars is at a stand-still, and they are most anxious to be allowed to pay the marriage tax as formerly. I have told them that I would punish both giver and receiver.

"On Rutton's head most certainly a price should be set. In returning from Cheylar with their prisoners, the Sodas passed close to Chachra, where there are some eight or ten of the Mounted Police, and meeting two Krar Banians, they made them also prisoners and compelled them to pay as a ransom about Rs. 50.

"I would strongly recommend at least 100 Sind Irregular Horse being sent out."

Enclosure to ditto, from Lieutenant Forbes, No. 2, dated 27th January.

"In forwarding the accompanying statement of Hurlal, Banian of Cheylar, I have the honour to inform you, that the Officer commanding at Omercote has written to me, that the Native Officer in charge of the Native Detachment at Cheylar has reported to him, for orders how to act, that the whole of the Banians of that place are on the point of leaving, and state that they will not remain unless furnished with a guard for the bazar.

"I beg to be informed if the Camel Sowars are to be kept on, as none of the Camel Corps have as yet arrived.

"The gang of Soda robbers, of which Rutton (Soda) is the Chief, has lately much increased. I have had them traced by one of the Bungalow Police,

Duffadar Nubbee Bux, to their head quarters in Bankree Burgong, a village about 25 to 30 coss NW. of Deesa, where they appear to be residing under the protection of the headman, Mookjee. I believe Bankree Burgong is in the Jodhpoor territory. Duffadar Nubbee Bux told Mookjee that Rutton and his brother Oomra would be required at his hands by our Government, and his answer was, that he was 40 years old, and might die that day or the next, but that he neither would give Rutton and his gang up, nor would he turn them out of his village.

"Rutton, who was present at the time, taking hold of his moustache, said that as yet he had only carried off a child (alluding to the son of the head Banian of Chore), but in future he would cut the heads off of any of the Krar Bunians he might meet, up to within even two coss or a coss of our Detachments.

"I would beg to recommend that a price should be set on the heads of Rutton, Oomra, Ranna, and Sumeera* (Sodas) of Omercote, and that both the Jodhpoor and Kutch Governments should be written to regarding them.

"When Rutton and Oomra carried off the Banian's son from Chore, they passed through, on their return to Bankree Burgong, the following villages, all of them in the Jodhpoor territory, viz. Hursanee, Seeanee, Kurraroo, Teratia, and Doreemna, but the route they have generally followed is by the Bakasier and Bayotia."

Enclosure to above, Statement of Hurlal, Krar Banian of Cheylar.

"About 12 o'clock six nights ago, when I was in bed in my house in the village of Cheylar, I heard some person or persons kicking at my door which was shut; and I got up, and looking through a hole saw eight armed men standing there. I could not recognize any of them, but from their dress should say they were all Sodas. They called out to me by name, and asked me if I was at home or not. I recognized the voices of two of those who spoke. They were Ranna and Sumeera, Sodas, of Omercote. I do not know Rutton Soda by sight, and can't say whether he was one of the party or not.

"After some time, not succeeding in forcing an entrance into my house, they went to my brothers Keesia's and Munia's house, which is next to mine, and having broken in the door of it, they entered, and seizing Munia's wife and daughter, and Keesia's son Hurchund, they carried them off prisoners. They also took away property to the amount of about Rs. 500.

"When these men had all gone, I went to the Sepoys in the fort* and complained to them. They said their orders were to take care of the fort but nothing else. There are about 40 Sepoys from Deesa in the fort. The fort is about 200 yards from my house."

On the receipt of the above, copies thereof, along with its enclosures, were Nos. 265 and 266, of the 31st January 1847. forwarded to the Political Agents of Jodhpoor and Kutch, by the Secretary to the Sind Government,

with a request that they would, if in their power, arrest the Chiefs, Rutton and Oomra, and their gang of Sodas. The attention of the Political Agent of Jodhpoor was also called to the conduct of Mookjee.

The Political Agent in Kutch replied—

No. 31, of the 4th February 1847. “ I have issued orders to the Jemadars of the Khosa Horse Police to use every means to arrest,

and to bring into Bhooj, the Omercote Sodas, Rutton and Oomra, and their followers.

“ I had previously received some account of the proceedings of those Sodas, and had warned the Khosa Police to be alert, in case of the gang of Sodas approaching the Thurr or Parkur districts, and had forwarded a Native communication on the subject to the Deputy Collector of Meerpoor.

“ I have, however, interdicted the Jemadars from entering the Jodhpoor territories for the purpose of making this arrest, which I respectfully hope will be approved of.”

The Political Agent, Jodhpoor, replied—

No. 26, of the 12th February 1847. “ I have the honour to acknowledge the receipt of your letter No. 265, of the 31st ultimo, with enclosure and to inform you that the necessary reference has been made to the Jodhpoor Durbar on the subject of Mokunjee, Thakoor of Birgaom, Marwar, harbouring Rutton, Oomra, and other Sodas of Omercote, charged with the commission of certain offences in their own country.”

The Collector of Hyderabad, in continuation of letter No. 71, of 29th January, No. 79, of 30th January. previously given, forwarded a further Report from Dated 28th January. Lieutenant Forbes, to the following effect:—

“ That since August last, Rutton Soda and his gang have carried off persons and property as follows :

“ Three camels from Chachra, by Rutton Soda. Restored on payment of Rs. 50.

“ A Banian and four camels from between Guddra and Chachra, by Rutton and Sumeera, Sodas. Ransomed for Rs. 40.

“ From near Parna in the Guddra Purguuna, a gold earring from a Banian. Not restored.

“ A camel, and the load of cotton and grain, from between Pattun and Chachra, by Rutton, Sumeera, Oomra (Sodas), and Deyseir (Doit). Camel restored at Bankree Burgong, by Rutton's servant Jujja, but neither the grain nor the cotton.

"A Banian from Jaghora, by Rutton Soda. Released on payment of Rs. 100.

"A man from near Jaghora, by Rutton. Not restored.

"A horse from near Korika-Thurr. Not restored.

"The son of the head Banian of Chore, (father wounded with a sword on the head,) by Rutton, Sumeera, Oomra, and Deyseir. Child still a prisoner.

"Four camels from near Parna, by Rutton. Not restored.

* "One woman and two children from Cheylar, and property to the amount of Rs. 500. Rutton, Sumeera, Oomra, Ranna (Sodas), and four others.

"Two Banians from near Chachra. Released on payment of Rs. 50."

On receipt of the above, the Secretary to Government wrote in reply—

"With regard to Lieutenant Forbes' official letter of the 27th instant, His Excellency is not aware where "Cheylar" is, nor does His Excellency know of any Detachment there; there is no such place in the Distribution Return of Troops in Sind.

"The Camel Sowars lately entertained must be kept on until the Camel Corps or Sind Horse relieve them.

"His Excellency does not learn from Lieutenant Forbes' letter what is the strength of this gang of robbers, nor what steps have been taken by that Officer with the Police on the spot and the hired Camel Sowars. The statement of Heera Lall Krar, of Cheylar, is that 40 Sepoys were in "the fort." What fort? Not Omercote; for that is not garrisoned from Deesa but from Hyderabad. His Excellency must know this before he can give instructions as to future arrangements.

"In reply to your own letter, His Excellency entirely concurs in your view of the case, which amounts to rebellion, and is not individual robbery.

"From your letter His Excellency does not discover, first, what numbers are in rebellion; secondly, what number remain obedient in appearance; and thirdly, what force is required to seize and confiscate the property of the whole of the Sodas in our territories, and march the men to Hyderabad (in chains if necessary). These points His Excellency wishes to know; not knowing them, loss of time would occur if His Excellency waited to hear.

"His Excellency, therefore, wishes you at once to seize such of the heads of the tribe as you can catch, and bring them in to Hyderabad, sending orders to the others to meet His Excellency, at their peril, at Hyderabad, on the 10th proximo. Secondly, if Lieutenant Forbes has not force enough to do this, Captain Baynes should take or send a large body of Police to help him. Thirdly, if you and Captain Baynes are of opinion that the Police are not strong enough, a troop of the Sind Horse (the enclosed note from His Excellency to the Officer commanding at Hyderabad is authority for the same)

should also be taken; but His Excellency would prefer that the Police should do the work, if Captain Baynes is sure of being able, for it will not do to *botch* the job. It must be done with vigour and effect, even though a large force were to go.

"His Excellency would wish you to keep secret from your subordinates what you determine upon doing, or the Soda Chiefs may also learn the same.

"I have written to Jodhpoor and Bhooj to have the parties seized if in those districts."

On the 10th March 1847 (No. 162) the Collector forwarded copy of a letter from Lieutenant Forbes, and stated—

"I would certainly beg to support his proposition that a price should be put on the head of Rutton Soda, in case he refuses the terms offered to him; and to show we are in earnest, would recommend that it should be a large one.

"At the same time, should this become necessary, I would further recommend the entire sequestration of the property of his brethren, the Omercote Sodas, now confined in the fort, or of so much as will indemnify the people for the plunder carried off by Rutton."

Lieutenant Forbes wrote—

No. 7, of the 8th March 1847. "I have the honour to forward the following extracts of letters this morning received from the Officer in Command at Omercote and the Kardar of that place.

"I have sent, some time back, persons to Rutton, Oomra, Ranna, and Sumeera, to inform them of His Excellency's promise of pardon on the conditions named by His Excellency, who have not yet returned; but in the event of their being fools enough to reject these terms, far better than they had ever any right to expect, and still insist on some provision for the future before they give up their evil practices, I trust you will excuse my again recommending that a price be set on their heads, and that I may be permitted to proclaim such the very day the answer, if given, may be returned to me."

Extracts.—"The Banians are in a great state of excitement, as Rutton Sing has been looting camels and horses about eight coss from this. The Sowars left the day before yesterday, but have not yet returned.

From the Kardar of Omercote. "On the 5th instant Rutton Soda carried off from Menghar, a village eight coss from Omercote, 20 camels, the property of residents of that place. I was on the point of following him up, when the Jemadar of Police, Mozdeen Khan, started in pursuit, taking two of my Sepoys with him."

To this the Secretary to the Sind Government replied—

No. 629, of the 15th March
1847

“That His Excellency sanctions your offering Rs. 1,000 on Rutton Soda's head, if he be brought in dead or alive.”

On the 30th March 1847 (No. 257) the Collector forwarded copy of a letter from the Deputy Collector, Meerpoor, transmitting the Report of the Jemadar of Mounted Police who went in pursuit of Rutton Soda and his gang, to the following effect :—

“After hearing of Rutton Soda and his gang having carried off by force some camels from the village of Megar, Purgunna Omercote, I, with four Government Sowars, two of the Kardar's Sepoys, and two Thakoors, Bhimjee the Rana's brother and Shere Sing Mulla's brother, started after Rutton and his gang, and arrived in the village of Megar. I traced them from there to Daheelee, Guddra Purgunna, from that, taking Taja (Soda), Patel of Daheelee, with me to Ruttar, Purgunna Chotun, in the Jodhpoor territory, where I was joined by Bhimjee (Soda), nephew of Khanjee, Chief of Guddra, with four of his own men and a Government Sowar. From Ruttar I traced them to Dubbur, Purgunna Goorker, where I arrived about 3 o'clock A. M. I was there given to understand that the robbers had halted at that place. They had placed their camels all round them in a circle, and were sitting down in the midst. On perceiving this I ordered the people to fire on the robbers; the camels were all standing. On this the robbers made a precipitate retreat, and I seized their camels, weapons, horses, &c., as well as those they had stolen, and made every search for them, sending horsemen all round, but without success. I have restored the stolen camels (20 in number) to their owners, and with the rest of the property returned to Omercote on the 17th March.

“I forward a list* of the property that fell into my hands on the occasion, and beg to report the good conduct of all the Sowars placed under me, and that the Kardar of Omercote renders me all the assistance in his power.” ●

* 5 mares.
1 horse.
3 matchlocks.
1 sword.
3 shields.

In reply to the above, the Secretary to the Sind Government wrote as follows :—

“I have the honour, by direction, to state, that if on inquiry it appears that the men behaved well, you should let them have the proceeds of the sale of the cattle taken. The arms should be sent into the Arsenal at Hyderabad.”

No. 851, of the 1st April
1847.

On the 8th April (No. 287) the Collector of Hyderabad transmitted copy of No. 16, of the 6th April 1847. a letter from the Deputy Collector of Meerpoor, who wrote—

“ I have the honour to inform you that Rutton (Soda) has this day arrived at Meerpoor, having come in on the terms offered by His Excellency the Governor.

“ He has brought with him and made over to me all the persons, as follows, he at different times carried off:

“ Dwarka Banian, son of Boolla of Chore.

“ Meerghbee, Banian woman, wife of Anka of Cheylar.

“ Hurchund Banian, son of Krisna of ditto.”

To this the Secretary to the Sind Government replied—

No. 964, of the 12th April 1847. “ The five Soda Chiefs confined in the Fort of Hyderabad may at once be released.

“ His Excellency begs that you will call upon these Soda Chiefs for a detailed statement of what they consider are the grievances they are subjected to, with such remarks of your own as you may consider the case to call for, with the view to its being disposed of by His Excellency.”

In reference to the above, the Collector wrote to the following effect:—

No. 372, of the 5th May 1847. “ I have the honour to report that the Sodas who were confined in the Fort left behind them with me, as their spokesman, Ankjee, brother of Rutton and cousin of the Rana of Omercote. The grievances or wants of the Soda tribe he states to be as follows :

“ 1st.—They used formerly to levy Rs. 26½ on each marriage among the Krar Banians as a marriage tax.

“ 2nd.—They used to take a rupee's worth or 24 haths of cloth from each Krar Banian as a fee for enforcing debts due by others to that tribe.

“ 3rd.—Ankraj, Ranoo, and Mulljee, Sodas of Omercote, had formerly forty fields rent-free ; now they have only twenty.

“ 4th.—Sham Sing and Bhoje Raj, of Chachra, had formerly twenty fields rent-free ; now they have none.

“ 5th.—Maha Sing Soda, of Aleghur, had formerly twenty fields rent-free ; now he has none.

“ 6th.—The Bijaree Sodas had formerly thirty fields free. Of these Khanjee Soda holds still seven fields rent-free ; the others have none.

“ 7th.—The Sodas had a hundred and thirty-seven Hyderabad rupees out of the customs of Omercote annually (equal to Co.'s Rs. 98-13-7).

“ 8th.—Relations living in the neighbouring Rajpoot States coming to attend marriages and returning, are now obliged to pay customs on the new clothes, food, &c. they bring or take away, which they did not do formerly.

"9th.—The Sodas are great consumers of opium, and find the high duty levied by the British Government on this drug very onerous, and beg they may be exempted from the operation of it.

"10th.—In times of scarcity the Sodas were allowed to import a camel-load of grain free of duty for each family, and pray that privilege may be continued.

"11th.—The Sodas used to have a Toyah (about $3\frac{1}{2}$ seers) allowed them on each field in the desert on both the cultivator's and Government share; they pray it may be continued.

"12th.—The Sodas when travelling were entitled to one feed for themselves and cattle without payment, taken from the Banians at each halting place.

"13th.—When the Sodas had guests staying with them, the Banians were obliged to find each guest with bedstead and coverlid for use during his stay, gratis.

"14th.—Ankraj and Maha Sing used to receive pay from the Ameers at the rate of Co.'s Rs. 59-8-11 each annually, or about Rs. 5 a month; and they beg this may be continued.

"15th.—The Sodas wish to contract with Government for the revenue of the desert, and would pay Co.'s Rs. 5,500 annually.

"These are the wants of the Sodas; and regarding them I would, as directed, beg to report as my opinion—

"1st.—That I think the allowing the Sodas to continue to levy this marriage tax on these Banians would not only be most impolitic but also most unjust, and I therefore would beg most strongly to oppose such concession; but I think the Sodas ought to receive compensation, and would submit that I think a most liberal compensation would be what I offered them three years ago, Rs. 14,000 down, or the interest of that sum annually at 5 per cent. (Rs. 700 per annum). This I believe they would gladly take now.

"2nd.—The claim to levy annually a tax of cloth on each Banian, I also consider as utterly inadmissible; and as the Sodas are not now employed to collect any debts, I consider the granting any compensation on this account unnecessary.

"3rd.—The reason (Ankjee tells me) Ankraj and Ranoo have now only twenty fields instead of forty is, because they at the time of getting the grant confirmed only cultivated that amount. If they can now cultivate forty, I would recommend forty being given to them.

"4th.—The reason (Ankjee tells me) that Sham Sing and Bhoje Raj have now no fields rent-free is, because they have not petitioned for any, as they do not cultivate any. I would recommend their having twenty fields given to them if they can cultivate them.

"5th.—The reason (Ankjee tells me) that Maha Sing has now no fields, is the same as in the last mentioned case; if he likes to cultivate twenty fields, I would recommend his being granted them.

"6th.—The reason that all the Bijaree Sodas' fields have lapsed, except Khanjee's, is (Ankjee tells me) the same. I would recommend the remaining twenty-three fields to be given them if they like to cultivate them.

"7th.—The amount the Sodas had formerly out of the customs of Omercote, a hundred and thirty-seven Hyderabad rupees annually, I would recommend being continued to them under the name of a pension.

"8th.—The claim for parties to be allowed in coming to marriages to bring with them clothes and food (not being for sale) free of duty, and to take them out of the country without question, I would also beg strongly to support; not only in the case of the Sodas and in reference to occasions of marriage, but as a general rule, applicable to all our subjects, and to all occasions of entering into or going out of our territories.

"9th.—The claim to exemption from the usual duties on opium I conceive to be wholly inadmissible. Those duties are laid down by the Government of India, are applicable to all India, and I think any exception in favour of the Sodas would be most impolitic; and as opium-eating is not a taste that deserves to have any particular tenderness shown to it by any Government, the exemption does not appear at all necessary.

"10th.—The allowing any peculiar privilege to the Sodas in times of scarcity over those enjoyed by other people I cannot advocate; but I think it would be of advantage if, at all times, and particularly in times of scarcity, the tax on the importation of corn were kept at the lowest point consistent with a registry being kept of imports of grain for the information of the State. At the same time the present tax is very little more than that levied at any time, and being levied on quantity, not value, decreases in times of scarcity to two per cent. on the value, an amount too small to afford even the semblance of a grievance, unless in the sight of people who have a very microscopic eye for such things.

"11th.—Regarding the grant of a Toyah on each field, I cannot recommend Government to regrant this. Our object is to abolish fees and dues, not to re-establish them; nor do I think any compensation is requisite in this case.

"12th.—The claim of the Sodas to be fed gratis by Banians when travelling, is preposterous; and I think compensation unnecessary in this case.

"13th.—So is the claim to have bedsteads and coverlids found gratis for guests. They should confine their hospitality to the number they can provide for at their own charge.

"14th.—The five rupees a month to Ankraj and Maha Sing is not an amount to quarrel about.

"15th.—I am afraid, if the Sodas held the farm of the desert, they would take advantage of their increased power to renew their old feuds with the Kosias, Syuds, and other Mussulman tribes there, and so create as much ill feeling among others, as the employing them that way created good feeling among themselves. In our measures to conciliate the Sodas, it seems necessary not to forget that there are others in the desert who are their bitter enemies; whom the Sodas would ride rough-shod over if they could, but who are as little inclined to stand riding over as any; who, as they have beaten the Sodas before, so they would beat them again; and the rousing of whom into a state of disaffection would be a much more serious matter than anything the Sodas, whether contented or discontented, could do. For these reasons, my own view has always been adverse to the granting any *power* or *influence* whatever to the Sodas of the desert, and I am sure in the end that policy will prove the true one; but any Soda cultivators or dependants, who choose to contract for the revenue of *their own grounds*, I would recommend being allowed to do so, and any amount of land the Sodas can have any pretension to I would recommend being granted rent-free to them.

"Having submitted all this for His Excellency's consideration, I would solicit His Excellency's orders."

To this the Secretary to the Sind Government stated in reply—

No. 1276, of the 10th May 1847. "The marriage tax on the Krar Banians is not to be levied. His Excellency sanctions the interest annually at 5 per cent. of fourteen thousand rupees as compensation in lieu of the tax.

"2. The claim to levy annually a tax of cloth on each Banian is not sanctioned, nor compensation.

"3. Ankraj and Ranoo may have forty fields if they will cultivate them.

"4. Sham Sing and Bhoje Raj may have twenty fields if they will cultivate them.

"5. Maha Sing may have twenty fields if he will cultivate them.

"6. The Bijaree Sodas may have the remaining twenty-three fields if they will cultivate them.

"7. One hundred and thirty-seven Hyderabad rupees annually, out of the customs of Omercote, is sanctioned under the name of a pension.

"8. The claim for parties (Sodas) to be allowed in coming to marriages to bring with them clothes and food (not being for sale) free of duty, and to take them out of the country without question, is sanctioned.

"9. The claim to exemption from the usual duties on opium is not sanctioned.

"10. No assistance will be allowed the Sodas in the time of scarcity.

" 11. The grant of a Toyah on each field is not sanctioned, nor compensation.

" 12. The claim to be fed gratis by Banians when travelling is not sanctioned, nor compensation.

" 13. The claim to have bedsteads and coverlids found gratis for guests is not sanctioned.

" 14. Five rupees per month to Ankraj and Maha Sing is sanctioned.

" 15. His Excellency will not allow the Sodas to contract with Government for the revenue of the desert, but any Soda cultivators or dependants who choose to contract for the revenue of their own grounds may do so, and any amount of land the Sodas can have any pretensions to is granted to them rent-free, on condition that they cultivate it."

On the 19th May 1847 (No. 418) the Collector forwarded copy of a letter from Omercote from Mr. E. Ord, 3rd Regiment N. I., and stated—

" A Thakoor here however, Jeuraj, tells me that he is sure Rutton can have left for no bad purpose; and I think what he says is very likely true. At the same time, I find that when Rutton came in, he left his family behind, on the pretence they were in debt and could not leave the place they were residing at, and also that he came in *alone*, leaving all the gang in arms just as before.

" Should he really have returned to his old practices, I would purpose going myself to Meerpoor and taking steps of the most decided kind to settle the business; and would, for that purpose, solicit permission to put a price of Rs. 3,000 on Rutton's head, and of Rs. 1,000 on the head of every other Soda that may be with him. Every thing of the Omercote Sodas that I could lay hands on should be seized, and their further residence in the British territory made impossible; but the other Sodas I would leave unmolested as long as their good behaviour continued, and I think it would continue from fear.

" Should measures of this kind be adopted, I have no fear that with the aid of a few Police and Beloochees of the desert, the outbreak would soon be put down; but at the same time I must say, as I said before, that I have every hope that it is merely a false alarm."

From Mr. E. Ord, 3rd N. I., dated 17th May 1847.

" I beg to state for your information, that Rutton Sing left this the day after his return from Meerpoor.

" The report was that on his arrival he asked the Banians if they would feed him? They refusing to do so, he left Omercote—the inhabitants seem to think to continue the same practices as before, that of stealing. The Sowar

has to-day reported to me that the Patel, Rutton Sing's brother, and others, with their families, are about to leave the Gaum to join Rutton. They say if Rutton begins his old practices again, they will be made prisoners of, and so they wish to leave this place. The Sowar asked what he should do? I told him to tell them they had better remain here till I heard from you. I shall feel obliged by your letting me know, at your earliest opportunity, if they are to leave the Gaum; also, if Rutton takes to looting, what steps are to be taken by the Sowars.

On the 28th June 1847 (No. 537) the Collector again wrote as follows:—

“ I have the honour to inform you that Native intelligence has been received of Rutton Soda having again commenced plundering, though on a small scale. Captain Baynes starts at once for Guddra, and I purpose following, if necessary, in a few days.

“ In accordance with His Excellency's instructions, I have placed in the hands of Captain Baynes an Istahar offering a thousand rupees' reward for Rutton's capture, and the same for the capture of his brother Oomra Sing, to be made use of should it be found that the statement of their having gone into rebellion is correct.”

On the 1st July 1847 (No. 570) the Collector of Hyderabad wrote—

“ I have this day received a letter from Lieutenant Jameson, Deputy Collector, Meerpoor, informing me that the report of Rutton Soda having returned to his old practices is erroneous.

“ While on this subject, I may mention that when there appeared a probability of military measures being necessary on the desert frontier, I transferred Lieutenant Jameson from the Shabunder district to Meerpoor, and Mr. Cole to Shabunder, as it seemed desirable, in the event of anything occurring, to have a military man as Deputy Collector in the Meerpoor districts.”

On the 20th August the same Officer stated (No. 736)—

“ With reference to the late correspondence about the Sodas, I have the honour to request that you will submit to the Governor, that they solicit that the amount awarded as compensation in lieu of marriage tax and compensation in lieu of quarter share of customs for Omercote, sanctioned by His Excellency, may be made to include the arrears since the British taking the country, during which period they have been deprived of these rights. As the request is equitable, I would beg most strongly to support it.

“ The Rana of Omercote and Sewraj of Chore also beg to be allowed to have the land watered by ten wells, which they purpose digging at Omercote,

amounting to a hundred beegas, and by seven wells to be dug at Chore, amounting to seventy beegas, rent-free. In accordance with the spirit of the policy approved by His Excellency as proper to be pursued towards this tribe, of depriving them of rights injurious to the just claims of the rest of the community, but at the same time showing them all personal favour and consideration within reason, I would beg strongly to support the prayer of this petition; also as doing much to conciliate their goodwill, at a cost, as the wells may never be dug if *they* do not dig them, of almost absolutely nothing."

To this the Secretary to the Sind Government replied—

No. 2431, of the 26th August 1847. "That His Excellency the Governor approves of your recommendation being carried out, viz:

"That the amount awarded as compensation to the Sodas in lieu of marriage tax and compensation in lieu of quarter share of customs for Omercote, be made to include the arrears since the British took the country.

"That the Rana of Omercote and Sewraj of Chore be allowed to have their land watered by ten wells which they purpose digging at Omercote amounting to a hundred beegas, and by seven wells to be dug at Chore amounting to 70 beegas, rent-free."

The Collector of Hyderabad, in continuation of his letter No. 736, of No. 809, of the 6th September 1847. the 20th August, further wrote to the following effect:—

"I find there is one point I omitted, which was to solicit that as well as the arrears of compensation for marriage tax and for share of customs of Omercote, the arrears of money allowance to the two, Akeraj and Maha Sing, who formerly enjoyed it, should also be given.

"This, at Co.'s Rs. 5 a month, the amount sanctioned, will amount to Co.'s Rs. 270 to each of these Chiefs, Akeraj and Maha Sing; and standing as the claims do on the same ground as the arrears for compensation on account of marriage tax and one-fourth share of customs, I would beg strongly to recommend that this be accorded likewise.

"It is, I trust, the last request I shall have to submit on the part of the Sodas of Omercote; the granting it will certainly leave no *equitable* claim unsatisfied."

The Secretary to the Sind Government replied to this as follows:—

No. 2618, of the 11th September 1847. "I have the honour, by direction, to state that the compensation, as recommended, is granted to the Soda Chiefs of Omercote."

In September 1849, the Government of Bombay, in transmitting audit on No. 5667, of the 17th September 1849. bills on account of annual pensions due to Sodas out of the customs of Omercote from 17th February 1847 to 16th February 1849, called upon the Commissioner to explain the nature of this charge and the authority under which it was incurred.

The whole of the circumstances connected with the settlement of those Chiefs was accordingly reported to Government in letter No. 2274, of the 28th November 1849, and the disbursements were sanctioned by Government in letter No. 5444, of the 15th December same year, to the Civil Auditor.

H. B. E. FRERE,

Commissioner in Sind.

No. II.

(Copy.)

No. 201 OF 1855.

REVENUE DEPARTMENT.

MEMORANDUM REGARDING THE ASSESSMENT OF THE
DESERT LANDS OF OMERCOTE, &c.

All the desert districts of the Narra and Jooda should be transferred to Omercote, with the exception of such portions as, from their proximity to Kipra, or from any other cause, the Deputy Collector may think it advisable to leave attached to the Narra.

2. He should ascertain, 1st, the ancient Purgunnas into which the district is popularly divided.

3. 2nd.—The names of all the permanent “Dchs”* or “Thurrs”† in each.

4. 3rd.—The names of the Patels and principal Zemindars.

5. A list should then be framed of all the Tulcees or fields, and recorded in a field book or “Jungle Kurda” in the following form:—

No.	Name of the Tullee, and Marks by which it is distinguishable.	Cultivator's Name.	Estimated extent in Begas.	Class in which the Field is to be placed.			Remarks.
				1st.	2nd.	3rd.	
1	2	3	4	5	6	7	8

6. The information in columns 1 to 4 should be obtained by the Kardar, aided by two “Ameens,” one of whom should be nominated by the Deputy Collector and one by the cultivators.

* Villages

† Wells

7. All three should sign the list of Tullees in any Deh, and each of the three may separately record any dissent from the opinion of his colleagues.

8. In cases of dispute as to estimated area, the Tullee should be measured.

9. After receiving the information contained in columns 1 to 4, for the whole district, from the parties employed, the Deputy Collector will settle what Tullees should go into each of the three classes, and will fix the rate for each class, and also for the uncultivated Tullees.

10. He should assign to each Patel one or more Tullees, according to his duties and the size of his village, to be held rent-free during good behaviour, as recompense for his official services.

11. A separate document, under the Deputy Collector's hand and seal, should be given the Patel, specifying the nature and extent of the grant, and of the duties expected of him.

12. When the field book is completed, four fair copies should be made, one for the Tuppadar, one for the Kardar's Office, one for the Hoozoor Dufter, and one for the Deputy Collector.

13. The Patel, if he wishes, should also be allowed to take a copy, and every cultivator who wishes for it should receive a paper, under the Deputy Collector's seal and signature, stating the above particulars relating to his own fields, and showing exactly the sum he will have to pay yearly.

14. The Annual Number Kurda will be a copy of the above, with any changes of ownership which may have taken place during the year. The cultivated Tullees only will be put into columns 5 to 7, and an extra column will be added for Tullees left waste. The total of the four columns will then give the year's Jumabundee.

15. The Deputy Magistrate should obtain from the Lieutenant of Police permanent Perwannas, not subject to annual renewal, permitting, during good behaviour, such of the Chiefs as come within the meaning of the orders of the late Governor, to carry their swords.

16. Any expenses beyond what are incident to the ordinary district duties should be drawn for in a contingent bill.

(Signed) H. B. E. FRERE,
Commissioner in Sind.

Commissioner's Office, Camp Bukkur,
19th January 1855.

Vide annexed Extract para. 2 of G. O. of 16th February 1844 :—
"All Chiefs who have made their salams are entitled to carry arms personally."

P. S.—The garden lands* should be assessed at a Beegotee cash rate according to their local advantages, and the ordinary rate for garden land (Rs. 1-7-4) should not be adhered to unless found to suit local peculiarities.

At the end of the season a report should be sent in for the information of Government, showing how far these instructions have been carried out.

(Signed) H. B. E. FRERE,
Commissioner.

(True copy)

J. GIBBS,
Assistant Commissioner.

* There are a few plots of ground artificially watered from wells at Omercote, where common native vegetables are grown.

No. III.

No. 254 of 1855.

REVENUE DEPARTMENT.

MEMORANDUM ON THE ASSESSMENT OF THE NARRA
TALOOKA—JANUARY 1855.

There is little known on record regarding this part of the Collectorate. Our establishments this year are almost all new to the district, and the proceedings of our late Native officials, since dismissed, have rendered the people so averse to a Beegotee assessment, that it is hardly practicable to do anything but make a concession to the general wish of the people, and allow of a Buttai settlement for the crops of the current season.

2. The duty should, as far as possible, be performed by the regular establishments, with such aid from temporary additions as the Collector may find necessary, to be paid for in the usual manner from the share set apart for expenses in the Buttai.

3. We must rely on the intelligence and activity of the present Deputy Collector to see that the Buttai is conducted, as far as possible, with fairness to all parties, with all reasonable celerity, and that the very valuable information deducible from a carefully conducted Buttai, as to the productive capabilities of the soil, is accurately noted and recorded.

4. He will, I trust, be able to report at the end of the season, from actual experiment, what amount of each description of produce is realized from a beega of the different kinds of soil, and what is the ordinary difference in the prices between this district and Hyderabad, these being two of the main elements in settling a fair assessment.

5. But it is to be hoped that another season will not elapse without some steps being taken to introduce a less uncertain mode of assessment; and the cultivators should be clearly given to understand that next year the assessment will be a Beegotee, the rate of which will be fixed this year, so that the people will know, when next they sow, exactly what they will have to pay.

6. The first step will be to ascertain, as far as possible, the ancient divisions into Dehs and Mukans (villages and hamlets).

7. Near the Narra and in the northern portions of the district, and around some of the few villages, it is possible there may be ancient sub-divisions into something like fields or separate Zemindarees.

8. These should, as far as possible, be ascertained, marked, and measured. Any Zemindaree or other rights which may be put forward, should be patiently enquired into and reported on.

9. But the greater part of the district is level Put, which has been uncultivated for many generations, is almost uninhabited, comparatively free from jungle, and with few natural or artificial marks of any kind.

10. Whatever is to be done in such localities, in the way of marking boundaries, must be new and artificial.

11. The best and simplest plan will, I think, be to mark the plain with two sets of parallel lines, one set running north and south, the other east and west, so as to intersect each other at right angles, and to divide the plain into a number of squares, like a chess-board, all of the same size.

12. The first question is, how large should these squares be?

13. About the size which one man can plough and sow with a pair of bullocks in one season, should be the standard. If the squares be less than this, the divisions will be needlessly minute; if they are larger, portions will be left waste, or we shall have two cultivators in one square, and consequently, disputes and confusion.

14. But how much can a man cultivate with one pair of bullocks?

15. Opinions vary, from 5 beegas to 40; and the proper size to fix should be one of the first points of the inquiry to be made.

16. It must be borne in mind that a man's cultivation for the season, is not always in one place. As the plain dries, he ploughs and sows a spot, as much as he can in one place. Where he stops ploughing, his neighbour begins, and by the time the first has finished, he is surrounded by other allotments. He then moves further on, to another dry spot, and commences a second field, and so on.

17. It is evident that, to suit such localities, the square should be less than what a man could cultivate all in one spot.

18. The best plan will be to ascertain, by actual examination and measurement of the cultivation this season, what is the actual general minimum size of separate allotments, and to fix something near that as the standard.

19. In fixing the number, some attention should be paid to the comparative arithmetical qualities of the number in dividing or squaring; thus 4 or 8 beegas would be more convenient than 5 or 10 or 3 or 9 to divide, because the halves and quarters are even beegas: 4 and 5 and 8 and 10 are all more convenient to Natives than 3 or 9 to double, square, or multiply. In fixing an uniform number, it will be well to bear this in mind.

20. It is possible there may be, in different parts, and on different soils, a considerable difference in the average size of allotments. This point should be inquired into.

21. When the size of the smallest squares has been determined, the question arises how shall they be marked out?

22. A ridge slightly hoed, like the side ridge of a cleared road, just high enough not to be washed away, will be sufficient to guide the cultivator in ploughing, and can be easily replaced, if there are, at regular intervals, marks of more permanent construction, such as heaps of earth, pillars of masonry, and the like.

23. By similar means, in future years, the square markings may be extended, if required, beyond the present flooded portion, which should of course be first marked out.

24. When the work is once started, the marking may be carried on by such agency as is used to mark out roads. A common compass, and a cross staff to give the correct direction and to make lines straight and angles correct, with a few pegs, measuring ropes, &c. will be all the apparatus required.

25. Some ingenuity and arrangement will be required to carry on the marking and measuring among growing crops without injuring them.

26. I purpose sending a copy of this Memo. to Lieutenant Fife, and asking him to communicate direct to the Deputy Collector in Charge any suggestions that may occur to him relative to the size of the allotments, and the mode of marking them off, and the best place to begin at.

27. The remarks in the Memo. on the Omercote Desert regarding Patels' allowances and garden land assessment will apply to the Narra also.

(Signed) H. B. E. FRERE,
Commissioner in Sind.

*Commissioner's Office, Camp Adwana Bunds,
23rd January 1855.*

(True copy)
J. GIBBS,
Assistant Commissioner.

(Copy.)

**MEMORANDUM BY LIEUTENANT FIFE, ENGINEERS,
ON THE NARRA FLOOD OF 1854.**

The important effect produced by the Bunds constructed by Lieutenant Soady, will be best understood by a reference to the annexed rough Sketch of the Narra Valley from the boundary of Meer Ali Morad to Omercote. Previous to the construction of these works in the neighbourhood of Togacha and Guddrun, any water which came down the Narra was conveyed south through no less than three large channels, the most eastern of which had its supply almost utterly wasted by escaping into numerous deep and extensive depressions between the sand-hills of the desert. Thurr depressions, or "Dhunds" as they are termed in Sind, are coloured yellow. During the past season, however, the whole of the water was confined by means of the Adwana and Narra Bunds (shown by red lines) to the west end of the three channels, and which Lieutenant Fife had previously ascertained to be so fruitful a source of revenue. The water, after passing the village of Mitrow, overflowed the west bank of the channel and spread for many miles to the south-west. It then took a course parallel to the Narra, running close past the villages of Joon and Searree, and ultimately passed the village of Samara, a distance of about 60 miles from Mitrow.

It is of course difficult to estimate the precise effect of the works in question, but there can be no doubt that the water which was formerly wasted in the Dhunds (coloured yellow) near Togacha and Duddur, has been transferred to the beautiful plain at Samara. The natives, too, entirely attribute the extensive fertilizing of the lands this season to the works, and they moreover point to a fact which shows that they thoroughly comprehend the matter. They say that putting aside the Dhunds near Togacha, from which the water was excluded, a remarkable difference is apparent in the quantity of water which went into the other Dhunds to the south, and which are still open to the water. The quantity of water which escaped into the Dhunds was less, and that on the plain greater than was the case during the previous season. In other words, the Bunds utterly excluded the water from the Dhunds near them, but from forcing it to take a more westerly course near Mitrow, less was wasted in the other Dhunds than formerly.

The probable increase of revenue during the present season over that of the last, is estimated at Rs. 40,000 to Rs. 50,000. The whole cost of the works being under Rs. 13,000.

(True copy)

J. GIBBS,
Assistant Commissioner.

(Copy.)

No. 297 of 1855.

PUBLIC WORKS.

REVENUE DEPARTMENT.

REMARKS BY THE SUPERINTENDING ENGINEER, ON THE
COMMISSIONER'S MEMORANDUM No. 254, DATED THE
23RD ULTIMO.

1. On the questions of assessment and collection of revenue I do not propose to offer any remarks, the opinion of many who have paid more attention to the subject than myself being available.

2. In dividing the land, roads should, I conceive, be provided for, both for public convenience, and that the Zemindars may have a free right of way to their lands without encroachment on that of their neighbours. Assuming that the size of each plot be 16 square beegas, which would make the length of each side 200 yards, I recommend that at every second lot in the one direction, and at every eighth lot in the other, 15 or 20 yards be left as public roads, thus—(see Fig. 1).

3. I doubt whether any hoed ridges or earthen mounds would leave traces after one, much less two or more seasons. The hoed ridges might easily be renewed, but I think some more permanent marks necessary at short intervals, say at each of the corners of each 16 plots as above described. The cheapest way of making these would probably be of burnt brick, built either dry or with mud, and of a cylindrical form. If all the bricks were made of this form (see Fig. 2), four of them would form one layer; and if they were properly bonded, I believe they would be very durable, even if subject to inundation: they should be about 3 feet high. These bricks might, if a few moulds were prepared, be made at convenient distances near the spots where they are required, and at about every two miles larger pillars might be built.

4. The best instruments for setting out these lines would be a small theodolite and a few 100-feet chains.

5. For convenience of registry, transfer, and reference, the lots should be numbered and designated; perhaps the designation might correspond with the Tappa.

(Signed) H. B. TURNER, Lieut. Colonel,
Superintending Engineer in Sind.

Larkhana, 9th February 1855.

(True copy)

J. GIBBS,
Assistant Commissioner.

Fig 1

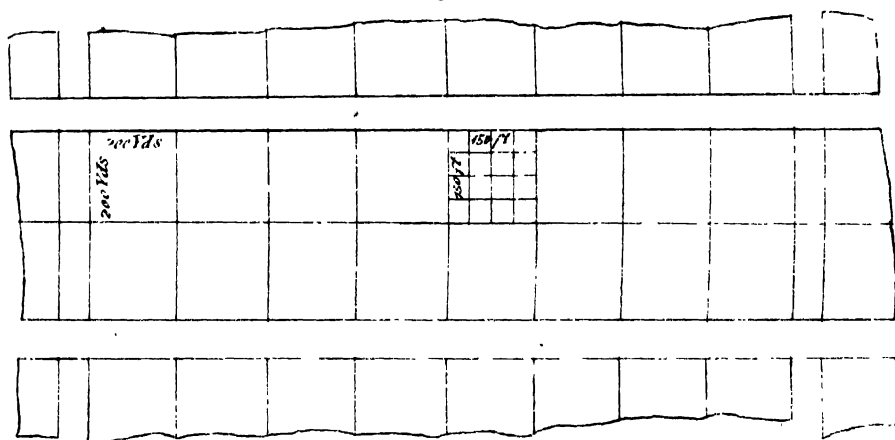


Fig. 2



(Copy.)

Statement showing the Annual Revenue of the Omercote, Shahgur, and Narra Districts, from the Conquest up to the year 1853-54.

Year.	Omercote.			Shahgur.			Narra.		
	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
Rubbee and Khureef, 1254, 1843-44 ..	213	5	8	198	5	7	848	6	10
„ 1255, 1844-45 ..	4,696	7	7	656	12	0	2,908	7	10
„ 1256, 1845-46 ..	2,019	10	4	1,081	4	6	2,656	5	6
„ 1257, 1846-47 ..	5,816	9	7	1,367	14	8	2,973	3	7
„ 1258, 1847-48 ..	1,310	12	2	4,197	11	9	1,096	0	11
„ 1259, 1848-49 ..	2,198	15	0	789	5	6	731	9	1
„ 1260, 1849-50 ..	9,933	11	3	2,641	15	4	347	5	1
„ 1261, 1850-51 ..	4,994	6	3	1,503	0	1	218	15	3
„ 1262, 1851-52 ..	4,886	13	10	1,503	0	1	863	14	7
„ 1263, 1852-53 ..	4,894	10	10	1,503	0	1	8,405	3	4
„ 1264, 1853-54 ..	4,887	6	8	1,503	0	1	20,918*	12	1
Total. . Rupees	45,852	13	2	16,945	5	8	41,968	4	1

NOTE.—The revenues of Shahgur are also shown as it has been generally under Omercote.

(Signed) A. F. BELLASIS,
Collector.

No. 119 OF 1855.

REVENUE DEPARTMENT.

The Commissioner in Sind has the honour to submit the above copy to the Right Honorable the Governor in Council, in reference to Commissioner's P. S. of letter of 12th February last, No. 62.

H. B. E. FRERE,
Commissioner in Sind.

Commissioner's Office, Camp Seetah, 23rd March 1855.

* Of this amount, Rs. 1,517-7-2 are still outstanding : with this exception, all the revenues entered in this Statement have been actually collected.

No. 1955 OF 1855.

TERRITORIAL DEPARTMENT,
REVENUE.

TO THE COMMISSIONER IN SIND.

Copy of the Resolution passed by Government, under date 10th May

Letter No. 62, dated the 12th February 1855, with accompaniments.

Memorandum No. 119, dated the 23rd March 1855, with accompaniment.

1855, on the communications, as per margin; from the Commissioner in Sind, regarding the Assessment of the Omercote and Narra Districts.

His Lordship in Council has perused with much interest the instructive details regarding the assessment of the Omercote and Narra districts, which these papers submit with the lucidity and completeness always found in Mr. Frere's statistical communications.

2. These districts have, on account of their remote situation, seldom been visited by Government Officials, and the information regarding them now communicated by Mr. Frere was greatly required, and is proportionably appreciated by Government. The attention which the Commissioner has now directed to these districts will, it is hoped, be fruitful of much advantage both to the inhabitants and to Government, as leading to the early development and practical application of measures for the supersession of the uncertain and arbitrary settlements hitherto prevalent therein.

3. The plan which the Commissioner has proposed with this object, has the entire concurrence of Government, and His Lordship in Council has learnt with much gratification that its details, as explained to the Chiefs and cultivators of the Omercote district, have been received by them with satisfaction. He has also been gratified by the testimony borne by Mr. Frere to the zeal, energy, and temper of Lieutenant Tyrwhitt, the Officer to whom the execution of the plan has been entrusted.

4. The works in progress with the object of obviating the uncertainty of the present floods of the Narra River, and of preventing the waste of water in the arid lands of the Dhunds, were described by Mr. Frere in his report dated 24th January 1855, No. 34, and are adverted to in the 45th and following paragraphs of the present communication. The results to be expected from these works are of a value and importance which command the greatest attention of Government.

5. The agency by which it is intended to carry out the measures proposed by Mr. Frere, is explained in the Commissioner's letter No. 63, of the 12th

February 1855. The arrangements therein described have been approved and sanctioned in the Government Resolution No. 1932, dated 8th May 1855.

6. These papers should be printed among the Revenue Selections of this Presidency, and the proceedings reported to the Honorable Court.

W. HART,
Secretary to Government.

No. 110 of 1855.

REVENUE DEPARTMENT.

FROM H. B. E. FRERE, Esq.,

Commissioner in Sind,

TO THE RIGHT HONORABLE LORD ELPHINSTONE, G.C.H.,
Governor and President in Council, Bombay.

Dated 19th March 1855.

MY LORD,

I have the honour to forward, for the information of your Lordship in Council, the accompanying copy of a letter from the Deputy Collector of Customs, with enclosures, on certain Statistical Returns of the Province for the year 1853-54; and I would submit that it might be appropriately printed among the Revenue Selections.

2. No doubt further inquiry will show that many of the data supplied to Mr. Dalzell are unsound, but this does not detract from the merit due to him for the use he has made of them; and it is one of the provinces of statistical inquiry, by pointing out apparent inconsistencies, to lead to the detection of errors, and to ensure greater correctness in future.

I have the honour to be,

My Lord,

Your Lordship's most obedient, humble Servant,

H. B. E. FRERE,

Commissioner in Sind.

Commissioner's Office, Camp Radun, 19th March 1855.

P. S.—A copy of the enclosures might be acceptable to the Chamber of Commerce.

H. B. E. FRERE, Commissioner.

(Copies.)

No. 117 OF 1855.

From the DEPUTY COLLECTOR OF CUSTOMS, Kurrachee,

To H. B. E. FRERE, Esq., Commissioner in Sind, on Circuit.

SIR,

I have the honour to forward herewith a Memorandum, with figured Statements, compiled from the Produce Returns of the season's Rubbee and Khurceef for 1853-54, of the several Deputy Collectorates in Sind, and the Returns of Trade of this Province.

2. The results exhibited are in some instances striking, and the discrepancies apparent in the comparative productiveness of the several principal Collectorates, worthy of remark.

3. As opposed to my own and the preconceived opinion of many, the large population of *cultivated* Sind will be viewed with some surprise. I only hope, that the data from which these results have been deduced may not prove to be fallacious.

4. It would add greatly to the value and interest of the Produce Returns were the number of towns, villages, wells, extent of canals, population, cattle, rate of revenue assessment, aggregate of assessment also exhibited in the return of each Deputy Collectorate. By thus increasing the available sources of information, the means would be afforded of not only examining and testing the Returns in every possible point of view, but of presenting a unique and interesting picture of the whole agricultural resources of the Province.

I have, &c.

(Signed) P. M. DALZELL,
Deputy Collector, Customs.

Kurrachee, Custom House, 2nd March 1855.

MEMORANDUM OF THE CULTIVATION, PRODUCE, CONSUMPTION, POPULATION, &c. &c. OF THE PROVINCE OF SIND, FOR THE YEAR 1853-54.

The annexed Statements show that out of 52,120 square miles, or 645 lakhs of beegas, the area of the Province of Sind as given in the "Bombay Gazette

Almanac" of the present year, about 15½ lakhs of beegas, or 2·40 per cent. only are under cultivation—a discrepancy accounted for by the large tracts of desert land which it embraces.

2. That the proportion of population to the whole area of the Province is 21, and to the cultivated area 871 souls to the square mile, or about 1·42 beegas per head.

3. That of the 15,47,218 beegas of cultivated land, there were devoted to the growth of—

Grain	14,32,738 beegas, or	92·6 per cent.
Oil and other Seeds	72,712 „ or	47 „
Cotton, Indigo, Sugarcane, &c. ..	41,768 „ or	2·7 „
Total..	15,47,218 „ or	100 „

Distributed as follows :—

Kurrachee	2,29,400 beegas, or	14·8 per cent.
Hyderabad	6,72,290 „ or	43·5 „
Shikarpore	6,45,528 „ or	41·7 „
Total...	15,47,218 „ or	100 „

4. The relative proportions of these productions in the several Collectorates are as follows :—

	Grain.		Seeds.		Miscellaneous.	
	Maunds.	Per Cent.	Maunds.	Per Cent.	Maunds.	Per Cent.
Kurrachee	11,21,130	18·4	12,212	18·5	36,150	47·1
Hyderabad	18,03,816	29·6	22,245	33·6	19,754	25·7
Shikarpore	31,66,077	52	31,664	47·9	20,817	27·2
Total.	60,91,023	100	66,121	100	76,721	100

5. Of the general productiveness of the soil, an idea may be formed from the following table :—

	Beegas Cultivated.	Produce, Maunds.	Produce per Beega, Maunds.
Grain	14,32,738	60,91,023	3½
Seed	72,712	66,121	0½
Miscellaneous	41,768	76,721	1½

And of its relative productiveness from the following :—

				Beegas Cultivated.	Produce in Maunds.	Produce per Bee- ga, Maunds.
Kurrachee	....	....	....	2,10,509	11,21,130	5 $\frac{1}{2}$ $\frac{3}{4}$
Hyderabad	....	....	....	6,27,490	18,03,816	2 $\frac{3}{4}$ $\frac{3}{4}$
Shikarpore	....	....	....	5,94,739	31,66,077	5 $\frac{1}{2}$ $\frac{3}{4}$
Grain				14,32,738	60,91,023	3 $\frac{2}{3}$ $\frac{2}{3}$
Kurrachee	....	....	....	17,191	12,212	0 $\frac{2}{3}$ $\frac{2}{3}$
Hyderabad	....	....	....	16,964	22,245	1 $\frac{1}{2}$ $\frac{3}{4}$
Shikarpore	....	....	....	38,557	31,664	0 $\frac{2}{3}$ $\frac{2}{3}$
Seeds				72,712	66,121	0 $\frac{2}{3}$ $\frac{2}{3}$
Kurrachee	....	....	....	1,700	36,150	21 $\frac{1}{2}$ $\frac{1}{2}$
Hyderabad	....	....	....	959	2,334	2 $\frac{1}{2}$ $\frac{1}{2}$
Shikarpore	....	....	....	814	8,500	10 $\frac{2}{3}$ $\frac{2}{3}$
Sugar or Jagree				3,473	47,073	13 $\frac{2}{3}$ $\frac{2}{3}$
Kurrachee	....	....	....	....	....	....
Hyderabad	....	....	....	11,799	3,942	0 $\frac{1}{2}$ $\frac{1}{2}$
Shikarpore	....	....	....	11,000	11,518	0 $\frac{1}{2}$ $\frac{1}{2}$
Cotton				22,799	15,460	0 $\frac{2}{3}$ $\frac{2}{3}$
Kurrachee	....	....	....	....	....	....
Hyderabad	....	....	....	14,263	12,340	0 $\frac{3}{4}$ $\frac{3}{4}$
Shikarpore	....	....	....	93	640	6 $\frac{3}{4}$ $\frac{3}{4}$
Tobacco				14,356	12,980	0 $\frac{3}{4}$ $\frac{3}{4}$
Kurrachee	....	....	....	....	....	....
Hyderabad	....	....	....	481	39	0 $\frac{1}{16}$ $\frac{1}{16}$
Shikarpore	....	....	....	325	70	0 $\frac{1}{16}$ $\frac{1}{16}$
Indigo				806	109	0 $\frac{1}{16}$ $\frac{1}{16}$

6. From this table it would appear that the soil of the Kurrachee and Shikarpore Collectorates is favourable to the cultivation of grain and sugarcane, whilst cotton, tobacco, and indigo would appear to succeed better in the Shikarpore than in the Hyderabad Collectorate, in which oil and other seeds seem to be cultivated with advantage, the produce per beega being 52 per cent. beyond the production of the other Collectorates.

7. But the discrepancies generally exhibited between the productive capability of the soil of the several Collectorates appear to me to be so great, that it is with considerable hesitation that I accept any of the results deduced from the Produce Returns which the annexed Statements exhibit. For example, the

yield of goor, or jagree, in the Kurrachee Collectorate, is given at $21\frac{1}{2}$ maunds to the beega, a quantity which the richest land under the most favourable circumstances could hardly produce. The yield in the Hyderabad Collectorate averages $2\frac{1}{2}$ maunds only.

8. Again, the yield of grain in the Kurrachee Collectorate is given at $5\frac{1}{2}$ maunds per beega, whilst in the Hyderabad Collectorate it is only $2\frac{1}{2}$; but this may, in some measure, be accounted for by the partial failure of the crops in that Collectorate, particularly in the district of Mahomed Khan ka Tanda, which I perceive noted in the Produce Returns of that Deputy Collectorate. Again, in the Shikarpore Collectorate the yield of cotton is given at $1\frac{1}{2}$ maunds per beega, whilst in the Hyderabad Collectorate it is only $\frac{1}{3}$, or a little less than one-third. Tobacco also, in the former Collectorate, is given at $6\frac{1}{2}$ maunds per beega, whilst in the latter Collectorate it is only $\frac{1}{6}$, or about one-sixth less.

9. It has been already observed that the population of Sind gives 21 souls to the square mile; the Shikarpore Collectorate, which is the most thickly populated, having 57, the Hyderabad Collectorate 18, and the Kurrachee Collectorate 12 souls to the square mile.

10. The following comparative table will be interesting, as contrasting the cultivated area of Sind with that of other Provinces in the Bombay Presidency, and showing the proportion of inhabitants to their areas respectively :—

Collectorates.	Area.	Quantity of Land Cultivated.		Proportion of Cultivation to Area.	Inhabitants.	Proportion of Inhabitants to Area per Square Mile.	Proportion of Inhabitants to Cultivation per Square Mile.
	Miles.	Acres.	Miles.	Per cent.		Souls.	
Ahmednuggur	9,931	17,98,262	2,810	28.3	9,95,585	100	354
Poona	5,298	12,73,394	1,990	37.6	6,66,006	125	335
Kandeish	9,311	13,56,806	2,120	22.8	7,78,112	83	367
Broach	1,319	4,73,588	740	56.1	2,90,984	220	393
Sind	25,859	49,02,052	7,660	29.6	27,30,687	106	356
	52,120	7,99,360	1,249	2.4	10,87,762	21	871

11. From this Statement it would appear that while 29.6 per cent. of the total area of the most favoured Provinces of the Bombay Presidency are under cultivation, Sind has only 2.4 per cent. of her area cultivated; but for that cultivation she has 871 souls per square mile, whilst the Provinces referred to average only 356 souls to the square mile; thus showing that the present population of Sind is equal to the cultivation of more than double the quantity of

land now brought into use—a fact, if the data at my command be correct, which would prove the necessity of greatly extending the means of irrigation, thereby diffusing over waste lands a population far too crowded to be prosperous.

12. The average annual consumption of grain in the Province would appear to have been 430 lbs. or 1·18 lbs. per diem for each head of the population. This of course includes the consumption of cattle, but it must not be forgotten that cotton seed, which is not included under the head of grain, forms a considerable item of annual consumption; so also do oil seeds after expression. Allowing the fractional part 18 as the annual consumption of grain, the human consumption would be one pound a day—a fair average allowance per head.

13. The consumption of seed, which is shown at 4 lbs. per head per annum, seems remarkably small, particularly when it is considered that nearly one-half of this quantity includes cotton seed, which is consumed by cattle only: so that the above estimate may be reduced to about 3 lbs. per head; a quantity which, if expressed, would yield perhaps $1\frac{1}{2}$ lbs. of oil. ~~Now~~ is this limited production compensated for by importations of oil, which were as follows:—

Imports by sea, 1853-54	Cwts. 527	
Do. by land „	285	
	<hr/>	812
Exports by sea „	1,773	
Do. by land „	2,940	
	<hr/>	4,713

Excess of exports over imports.. Cwts. 3,901

which must be deducted from the estimated consumption of the Province, thereby further reducing it to 1 lb. per head, or say 5 lbs. per annum per family of five individuals; a quantity altogether inadequate, I should suppose, for twelve months' consumption of a family with the most rigid economy.

14. The consumption of goor would appear to be $6\frac{1}{4}$ lbs. per head per annum, but this cannot be relied upon, as I have elsewhere shown that the quantity of goor produced is incompatible with the extent of land stated to have been under cultivation. The consumption of goor must be taken in conjunction with the consumption of sugar, the import and export of which were as follows:—

Imports by sea, 1853-54	Cwts. 24,088	
Do. by land „	19,175	
	<hr/>	43,263
Export by sea, „	276	
Do. by land „	2,069	
	<hr/>	2,345

Excess consumed in the Province.. Cwts. 40,918

which is nearly $4\frac{1}{4}$ lbs., or sugar and goor together $10\frac{1}{2}$ lbs. per head.

15. Both saltpetre and indigo show an excess of export over both production and import; in the former of 11,529 maunds, and of 854 maunds in the latter, which, without going further, proves that the Produce Statement of the several Collectorates are by no means veritable documents. It is possible that a portion of these articles might have been the stored produce of a previous season; but the quantities are too great to admit wholly of this explanation. Saltpetre besides is a perishable article, which would not be stored if avoidable.

16. To be of any statistical value, statements of the nature under criticism should be prepared with the utmost care, otherwise they are worse than useless.

17. The following table shows the proportion of land devoted in each Collectorate to the cultivation of grain, seeds, and other produce:—

	Kurrachee.		Hyderabad.		Shikarpore.		Total.	
	Beegas.	Per cent.	Beegas.	Per cent.	Beegas.	Per cent.	Beegas.	Per cent.
Grain	2,10,509	91·8	6,27,490	93·2	5,94,739	92·1	14,32,738	92·6
Seeds	17,191	7·5	16,961	2·5	38,557	6·	72,712	4·7
Jagree	1,700	0·7	959	0·1	814	0·1	3,473	0·2
Cotton .....	..	..	11,799	1·8	11,000	1·7	22,799	1·5
Tobacco .....	..	..	14,263	2·1	93	0·1	14,356	0·9
Indigo .....	..	..	481	0·7	325	0·5	806	0·5
Other articles ....	..	..	334	0·5	..	..	334	0·2
Total..	2,29,400	100	6,72,290	99·9	6,45,528	100	15,47,218	100

18. In conclusion, I would again regret the abolition of the establishments for the registration of the frontier trade, as, without a knowledge of that trade, it would be difficult to present a correct statistical view of the social, commercial, and agricultural condition of Sind.

19. The foregoing observations are respectfully submitted, with a hope that they may have the effect of directing more attention to the correct preparation of the Cultivation and Produce Returns, which can be valuable and interesting only in proportion to the care bestowed to render them reliable vehicles of information.

(Signed) P. M. DALZELL,
Deputy Collector, Customs.

(True copies)

J. GIBBS,
Assistant Commissioner.

Table showing the whole, and the Cultivated Areas of each of the Collectorate in Sind, together with their Population, Consumption, &c.

Collectorates.	Area of Collectorates.		Quantity of Land under Cultivation in 1853-54.	Proportion of Land Cultivated to Area.	Population.	Population to a Square Mile.	Consumption per head per Annum.					Remarks.
	Square Miles.	Beegas.					Consumed as per Statement.					
							Grain, Maunds.	Seeds, Maunds.	Jaggere, Maunds.	'Otton, Maunds.	Toracco, Maunds.	
Kurrachee	16,000	1,98,24,000	2,29,400	1.16	1,85,550	11.60	Seers.	Seers.	Seers.	Seers.	Seers.	The area and population have been taken from the Gazette. Almanac for the present year. The area, which is given in square miles in the Almanac, has been converted into Beegas, at the rate of 2,500 square yards to a Napier Beega, which gives 1,230 Beegas to a square mile.
Hyderabad	30,000	3,71,70,000	6,72,290	1.81	5,51,811	18.39	215.34	2.85	3.10	1.97	0.60	
Shikarpore	6,120	75,82,680	6,45,528	8.51	3,50,401	57.25						
Total..	52,120	6,45,76,680	15,47,218	2.40	10,87,762	20.87	215.34	2.85	3.10	1.97	0.60	

(Signed) P. M. DALZELL,
Deputy Collector, Customs.

(True copy)
J. GINNS, Assistant Commissioner.

Produce by Sea and Land, and the Balance Consumed in the Province,

Price and. lowest.	IMPORTED.		Total Cultivated and Imported.	EXPORTED.			Balance Consumed in the Province.
	By Sea.	By Land.		By Sea.	By Land.	Total by Sea and Land.	
s. as.	Maunds.	Maunds.	Maunds.	Maunds.	Maunds.	Maunds.	Maunds.
0 15	..	..	5,89,419	20,866	..	20,866	5,68,553
1 6	..	..	1,729	..	..	..	1,729
1 2	152	8,875	21,271	4,986	..	4,986	16,285
1 1	292	1,986	10,06,203	70,291	2,722	73,013	9,22,090
0 13	..	..	4,437	..	..	..	4,437
1 2	2,502	2,401	56,726	60	1,980	2,040	54,686
1 0	2,623	28,736	18,22,031	..	8,464	8,464	18,13,567
1 1	6,963	47,613	21,34,787	68,481	1,32,942	2,01,423	19,33,364
0 13	..	..	77,286	..	526	526	76,760
1 0	..	2,664	1,21,863	6,592	..	6,592	1,15,271
1 6	..	..	1,152	357	..	357	795
3 0	..	..	160	32	..	32	128
0 14	41,046	10,370	3,82,242	17,881	18,876	36,757	3,45,485
0 11	..	..	1,398	..	..	..	1,398
0 6	..	..	24,861	..	..	..	24,861
0 10	..	..	592	..	..	..	592
1 5	..	617	1,420	..	608	608	812
1 10	..	..	161	..	..	..	161
1 1	4,963	2,174	7,262	1,414	7,951	9,365	..
..	58,541	1,05,436	62,55,000	1,90,960	1,74,069	3,65,029	58,80,974
1 8	..	1,265	7,151	24,153	719	24,872	..
1 9	..	..	306	..	..	..	306
1 4	..	27,489	60,644	19,012	7,935	26,947	33,697
1 1	..	..	12,333	..	..	..	12,333
1 3	..	3,268	13,305	25,161	..	25,161	..
..	44	..	604	..	..	..	604
2 10	25,059	3,289	31,598	851	219	1,070	30,528
1 2	..	261	598	736	300	1,036	..
0 13	..	..	10	..	..	..	10
2 4	178	233	658	169	559	728	..
..	25,281	35,805	1,27,207	70,082	9,732	79,814	77,478
3 7	6,750	34,793	88,616	63	4,259	4,322	84,294
4 8	61	23,559	24,020	33,421	128	33,549	..
6 9	4,226	33,587	53,273	586	866	1,452	53,501
1 10	3,678	2,939	19,597	583	2,797	3,380	16,227
32 0	11	5,139	5,259	5,068	1,045	6,113	..
1 2	..	..	699	..	..	..	699
..	14,726	1,00,017	1,91,464	39,721	9,095	48,816	1,54,721

(Signed) P. M. DALZELL,
Deputy Collector, Customs.

No. 1843 OF 1855.

TERRITORIAL DEPARTMENT,
REVENUE.

TO THE COMMISSIONER IN SIND.

Copy of the Resolution passed by Government, under date 3rd May 1855, on a letter from the Commissioner in Sind, No. 110, dated 19th March 1855, with enclosures, being Statistical Returns of that Province for 1853-54, prepared by Mr. Dalzell, Deputy Collector of Customs.

Mr. Dalzell's present communication is very creditable to him, and is acknowledged in favourable terms by Government.

2. This Report will be printed in an early number of the Revenue Selections.

W. HART,
Secretary to Government.

No. 1844 OF 1855.

TERRITORIAL DEPARTMENT,
REVENUE. •

TO H. B. E. FRERE, Esq.,
Commissioner in Sind.

SIR,

I am directed to forward copy of a Resolution passed by Government on your letter No. 110, dated the 19th ultimo, and to inform you that His Lordship in Council is of opinion, that measures should be taken to obtain more correct Returns in future. It appears that in many instances those now submitted are more than doubtful.

I have the honour to be,

Sir,

Your most obedient Servant,

W. HART,
Secretary to Government.

Bombay Castle, 3rd May 1855.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

NO. XXII.—NEW SERIES.

SECOND REPORT,

WITH APPENDICES,

ON THE

SUPPLY OF WATER TO BOMBAY,

BY

H. CONYBEARE.

ALSO,

**OBSERVATIONS ON MR. CONYBEARE'S SECOND
WATER REPORT,**

BY

MAJOR J. H. G. CRAWFORD.

B o m b a y :

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1855.

CONTENTS.

	PARA.
Objects of the Survey	1
List of Plans and Sections accompanying Report	2
Datum at Poydownee	3
Datum in the bed of the Goper, at Puspolee	4
An adequate Water Supply for Bombay can only be obtained from surface collection	5
The Valley of the Goper the only eligible source for such a supply	6
Description of the Valley of the Goper	7
The lower portion of the valley is flat, and unfavourable ; but at a distance of about 16 miles from Bombay the valley contracts, and affords two favourable sites for damming	8
Above this contraction the valley expands into a wide basin, extremely favourable for water-storing purposes	10
Four gaps in the hills, forming the southern margin of the Vchar Basin, will require to be closed by dams, if the lower site for a dam be adopted.	12
Description of these gaps	13
By excluding the lower portion of the basin from the reservoir, and damming across the Goper at the Syec site, the principal of these four dams may be avoided altogether	16
The enclosed reservoir would still contain storage-room for 9,000,000,000 gallons, which is ample for the wants of Bombay	16
Two estimates have been prepared : the first, for a reservoir with four dams, including the whole of the Vchar Basin, and a portion of the Valley of Marole ; and the second for a reservoir with three dams, excluding the lower portion of the basin	17
4,000,000,000 gallons per annum required for the supply of Bombay, at the rate of 20 gallons per head per day	19
The Goper Valley is adequate to the collection and to the storage of a larger supply	19
Rain-fall on the gathering-grounds	20
Average rain-fall at the level of the sea at Tanna, 5½ miles from the gathering-grounds, from 106 to 124 inches per annum	23
The rain-fall over the gathering-grounds must be considerably more, as they average at least 300 feet above Tanna.	24
Experience has shown, that from six-tenths to eight-tenths of the total rain-fall are available under similar circumstances	26
It is calculated that at least six-tenths will be available in the present instance	28

Area of the gathering-grounds if the whole basin be included therein	29
Area of the gathering-grounds if the smaller reservoir be adopted. . . .	30
Amount of rain-fall available in each case	31
If necessary, the area of the gathering-grounds might be considerably enlarged ; but it is not necessary that the reservoir should be filled in the first monsoon.	32
Storage capacity of the larger and of the smaller reservoir, at different water- levels	33
At 80 feet, the larger reservoir will contain 9,000,000,000 gallons	35
At 84 feet, 11,000,000,000 gallons	36
At 85 feet, the smaller reservoir will contain 9,000,000,000 gallons . . .	37
The result of Observatory experiments on the annual amount of evaporation generally considered by hydraulic engineers to be an over-statement . . .	38
Ground for such opinion	39
In the present case, however, an amount of evaporation will be provided for equal to the result of the Observatory experiments	40
Evaporation assumed equal to 60 inches (5 feet) during the eight dry months ..	43
Amount on this scale of annual loss from the larger reservoir, with its high-water level at 80 feet, would be 1,505,536,406 gallons	44
No apprehension need be entertained of any material loss from leakage	47
By far the largest works of the kind ever constructed have been executed by Native engineers in Rajpootana, and Central and Upper India, without the occurrence of leakage	48
“ Soakage ” is not even noticed as a source of loss in any of the engineering for- mulæ relating to the design and construction of reservoirs	48
The soil and sub-soil at Vehar are of unusually retentive character	49
Large surplus in the reservoirs sufficient to make up for an enormous amount of leakage ; and there will be no difficulty in damming	51
Advantages of earthwork over masonry as material for dams	52
Construction of earthwork dams	53
Construction of masonry dams	57
Thickness of masonry dams	58
Formulæ for their proportions	58
The Aide-Mémoire formula is that generally followed by the French engineers .	59
The earthwork dam has six times the mass of the masonry one, and cost only half as much	60
Contoured Plans of the different dam sites	62
All the dams have the same top width, and the same slopes	63
Table exhibiting particulars and cost of each dam	64
Cost of reservoirs very small in proportion to the amount of water stored ..	66
Cost of similar work in England	67
Waste-weirs 340 feet wide, which, when the water is 18 inches over their surface, will suffice for the discharge of 50,206,448 gallons per hour, cost of waste- weir for the smaller reservoir £157	69
Works required in the neighbourhood of the dams	70
Their nature depends on the mode in which the water is to be conveyed to Bombay	71

	PARA.
The gravitation system	72
The pumping system	74
The gravitation system by far the most economical	77
Nature and probable cost of the works required between the reservoir and main conduit	78
Were these on the usual plan, the cost would be heavy, and the available head of water would not exceed 65 feet	78
A more economical arrangement proposed, which would also double the available head	79
Description of the usual arrangement of the works between the reservoir and main conduit	80
Precautions to be taken in drawing the water off a reservoir	81
Two arrangements in use for the purpose : the sluice tower, with inlets at different heights, cost £1,867	82
The jointed main, with floating inlet	83
The latter the cheaper of the two, but more liable to get out of repair	84
Self-acting sluice	85
Its mode of action	86
When the water is carried without any communication with the air from the interior of the reservoir to the distribution (as it will be under the new arrangement proposed), no regulating appliance such as the self-acting sluice is required.	88
Filtration : usual construction of filters	89
The cost of filtration depends on the daily quantity to be filtered, on the number of square yards of filtering surface required for such amount, and on the cost per square yard of the description of filter adopted	91
The cost of filters varies from 18s. to 20s. per square yard ; 18s. the rate adopted. If the water was filtered three times, the cost of the requisite filters would be £14,498	92
If the water was filtered twice, the cost of the filters would be £11,180	93
If only filtered once, the cost would be £9,090	94
The pure-water basins are usually in duplicate : at Vehar, it is thought that one will be sufficient, the cost of which will be £5,400	95
If the usual arrangement were adopted, the cost of the works between the reservoirs and the conduit pipe outside would be £21,094	96
New arrangement recommended, in lieu of the above, would cost only £4,302	97
It will consist of a filtering tower 50 feet in diameter inside, built of highly porous littoral concrete, rising from the foot of the inner slope of the dam, the inlet of the main conduit pipe being within the tower	98
Main conduit pipe ; its material, diameter, and thickness of metal	99
Wrought-iron pipes have not been found to answer	104
A cast-iron pipe will therefore be estimated for	105
In former Report Hawksley's formula was adopted	105
Subsequent experiments have fully confirmed De Prony's.	109
The latter therefore adopted	110
Formula for calculating the thickness of the pipe	111
	112

6,112 yards of the pipe should be 1 inch in thickness ; 2,592 yards $1\frac{1}{8}$ inch in thickness ; and 16,816 yards $1\frac{1}{4}$ inch in thickness. The whole length will be 25,520 yards, and the total weight 16,725 tons 4 cwt.	114
The cost of the pipes delivered at Bombay will consist of three items,—the current price of pig-iron, the cost of manufacturing, and the freight to India	116
Present price of pig-iron at Glasgow, from 66s. 6d. to 68s. per ton	116
Cost of manufacturing, including profit, 28s. to 30s. per ton	116
Present freight to Bombay, from 35s. to 40s. per ton ; and hamallage 5s. per ton	116
At this rate the cost of the pipes delivered at Bombay would be £7 8s. per ton. Glasgow is the cheapest place for pipes ; but there is little shipping employed between that port and Bombay	117
At least part of the freight required must therefore be obtained at Liverpool	119
On which account the cost of the pipes delivered at Bombay is estimated at £8 per ton, instead of £7 8s.	121
Cost of main pipe, weighing 16,725 tons, at £8 per ton, £133,800 ; and laying it 25,520 yards, at £1 per yard, £25,520 ; altogether £159,320	122
A distribution reservoir	123
Not required in the present case	125
It would increase the cost of the works, and diminish the head of water available in the town	125
Distribution.—As the cost of the waterworks is to be defrayed by a general rate, the supply should be brought within the reach of every inhabitant of the island	126
The town distribution should be constant, and high-service ; and no house in any street should be more than 100 feet from a public source of supply	127
Description of such public sources of supply	127
Supply to the villages within the island will be by means of draw-wells, kept full from the main pipe	127
The supply to Malabar Hill will be intermittent, laid on during the night	128
The street-mains will be 54 miles in length, and will cost £13,200	131
The cost of the village distribution will be £1,973	133
The total estimated cost of the works is £231,206, exclusive of contingencies, land, and engineering expenses.	134
This will amount to about 10s. per head, which is less than half of the cheapest rate at which any English towns have been supplied	138
Were the diameter of the main pipe reduced below that estimated for, the supply, after deducting for waste, would be inadequate to the wants of Bombay	140
Enormous amount of waste in the best constructed works	141
Advantages of a single set of works for the supply of a town, and necessity of providing for future wants in designing waterworks	143
Were the works made of only half the estimated capacity in the first instance, and afterwards completed, the cost would be £50,000 more than if they had been completed at once	146

PARA.

Time required for the completion of the works will depend on the delivery of the pipes	147
The order for the pipes would take at least a twelvemonth to complete, and five months must be added for the conveyance to Bombay	148
But the dams might be commenced as soon as the castings by which they are traversed could be prepared	149

PAGE

APPENDIX A.—English rates for the description of work required for water-works	43
Mr. Hawksley's schedule of rates for the Liverpool Waterworks .	43
Table showing the prices at which the dams of reservoirs have been contracted for in twenty-six English localities	44
APPENDIX B.—On local rates for masonry, earthwork, &c.	46
Schedule of railway contract rates	46
Office rates of the Superintendent of Repairs' Department	50
Rates of the estimate, and of the lowest tenders for the filling in of Mody Bay, on the sea-face of the Fort of Bombay	51
Rates at which bungalows are constructed on Malabar Hill	54
Rates at which the Byculla Club Chambers were constructed	54
APPENDIX C.—On aqueducts, and the cost of pumping by steam-power	56
Cost of engine-power	58
APPENDIX D.—On the proportions and cost of pipes	61
Liverpool Corporation Waterworks.—Determination of the average cost per yard of the pipes to be laid from Rivington to Old Swan, near Liverpool	61
Contracts for 44-inch pipes	62
Particulars of the progress of the 44-inch pipe contracts for the Corporation of Liverpool, as returned by Mr. Absalom Francis, Jr., Pipe Inspector, showing the time they took in making	63
Mr. Newland's schedule of cost of mains.	64
Schedule of sizes of pipes, given by Mr. Duncanson	64
Cost of laying 24-inch main	64
Dimensions and weights of cast-iron and lead pipes	65
APPENDIX E.—Memorandum of heights above the sea of different inhabited points on the island of Bombay, according to the sections of work of drainage on the records of the office of the Superintendent of Repairs	66
Observations on Mr. Conybeare's Second Water Report, by Major J. H. G. Crawford	71

WATER SUPPLY FOR BOMBAY.

(SECOND REPORT.)

To W. HART, Esq.,

Secretary to Government.

SIR,

I have the honour to report the results of the examination I have undertaken, in accordance with your letter No. 3534, of 4th December 1854, with the view of ascertaining the adequacy of the Valley of the Goper to the collection and storage of an amount of rain-water sufficient for the supply of Bombay ; and of ascertaining also the cost at which such supply might be rendered available to public use : also regarding the points noted for careful consideration in paragraph 7 of a despatch from the Honorable the Court of Directors, No. 42, dated 13th September 1854, forwarded to me by your letter No. 358, dated 24th January 1855, viz. " the proper diameter for the main pipe which is to bring the water into Bombay ; the thickness of the iron of which it is formed ; the strength and height of the dams ; and the evaporation and soakage which is to be allowed for in the lake."

2. The Plans and Sections accompanying the Report are as follows :—

I. Index Map to the Surveys ; exhibiting, also, the principal Mains for distribution.

List of Plans and
Sections accompanying
Report.

II. Contoured Plan of the Vchar Basin.

III. Section and Plan of the Course of the Conduit Pipe or Aqueduct from the proposed Lake to the centre of the Native Town of Bombay.

IV. Large scale Contoured Plan of Dam No. I.

V. Ditto ditto ditto of Dam No. II.

VI. Ditto ditto ditto of Dam No. III.

VII. Ditto ditto ditto of Dam No. IV.

VIII. Ditto ditto ditto of Dam No. V.

IX. Section of Principal Dam in connection with Filters.

X. Plan of Filters.

XI. Plan of the Native Town of Bombay, exhibiting the distribution.*

XII. Plan of the Fort of Bombay, exhibiting the distribution.*

3. The datum to which all the levels below the proposed reservoir have been referred is supposed to be 100 feet below

Datum at Poydownee. the kerbstone of the platform of the Poydownee Reservoir. This reservoir is situated exactly in the centre of the Native Town, and the principal branch mains will leave the conduit pipe in its immediate vicinity. This Poydownee datum is 3.11 feet above high-water mark.†

4. The levels of the contoured plans of the Vehar Valley and of the dams are referred to a datum established in the bed of the Goper, at what would be the deepest point in the proposed reservoir were the valley dammed across immediately above Puspolee, the most southerly point practicable. I have called this the Puspolee datum. It is 92 feet higher than the bench-mark at Poydownee datum.‡

5. In my former Report on the subject of the Water Supply, I stated that surface collection was the only source by which Bombay could be supplied with water; and that for supplying a town on this system, the valley or valleys debouching in its neighbourhood should be traced upwards, until some natural basin is found (at a sufficient elevation above the town), in which a sufficiently large body of water might be collected (from surface drainage), and retained in storage reservoirs by a moderate amount of embanking.

6. The only valley debouching on the neighbourhood of Bombay is that of the Goper. The island of Bombay forms, in fact, a continuation of this valley; so much so, that before the construction of the embankments between Sion and Worlee, that stream used, when in flood, to traverse the island of Bombay on its way to the sea.¶ The

* The first two only of these plans have been lithographed, and of these No. II. is on a very reduced scale. The scale of the plans is too large for lithography (No. III. is 30 feet long), and their reduction would occasion unnecessary expense.

† The high-water mark is that on the lock-gate of the Bombay Dockyard, and is 18½ feet above low-water mark.

• The height of a bench-mark, taken on the north-east corner of the flat plinth from which the pedestal of the Wellesley Statue rises, is 7.30 feet above high-water mark; the road opposite Framjee Cowasjee's Tank is 9.47 feet above high-water mark; thence the ground falls to the bench-mark, which is 3.11 feet above high-water mark, and 3 feet below the top of the parapet of the reservoir, which is 6.11 feet above high-water mark.

‡ The bench-mark is indicated by a B chiselled in the rock.

¶ Hamilton's Indian Gazetteer, Article "Bombay."

capabilities of the Valley of the Goper in respect to the Water Supply of Bombay were first pointed out by Major Crawford in 1846.

7. The Goper debouches on the mangrove marsh which separates Bombay from the islands of Salsette and Trombay, at a point about 9 miles distant from Bombay Cathedral. Ascending it from thence, the hills, at first detached and distant, gradually approach and unite into ranges, till near Puspolee, about 16 miles from Bombay, the valley suddenly contracts to a narrow gorge.

8. Below this point, the ground in the neighbourhood of the Goper offers no facilities to the construction of dams or reservoirs; but the gorge above Puspolee is about a mile in length, and contains two exceedingly good sites for a dam. These sites are numbered III. and V. in the accompanying map of the Vehar Basin. A round-topped rock in the bed of the Goper at the most southern of these two sites is the Puspolee datum, to which all vertical measurements in the contoured survey of the basin have been referred. The most northern of these two sites is in the village lands of Syee.

9. Above this gorge, the valley expands into a wide plain, or basin, surrounded with very high wooded hills. Vehar is situated in the centre of this basin.

10. The Basin of Vehar is particularly well adapted to the storage of water: its bottom is extremely flat, and covered with a tenacious clay, of which bricks and common pottery are made, while the hills which form its sides rise abruptly, and are composed of compact unstratified rock.

11. The capabilities of economical water-storage of this basin are so great as to be palpable at first sight; but a measurement of the contributing area and contoured surveys of the basin were necessary, to ascertain whether it was adequate to the collection, and to the economical storage of the annual Water Supply required by an increasing population of upwards of half a million; and also at what cost the supply that might be so afforded could be made available to public use.

12. The cost of the proposed reservoir will, of course, depend on the conformation of the ground, as well as on the amount of storage capacity required. The gorge through which the Goper escapes is the lowest, but not the only breach in the circle of hills that surrounds the Basin of Vehar. There are three other weak points along the southern margin of the

Four Gaps in the Hills, forming the Southern Margin of the Vehar Basin, will require to be closed by Dams, if the lower site for a Dam be adopted.

proposed reservoir, which would have to be stopped up by dams, were the water ponded back to the depth of 60 feet above the Puspolee datum, by a dam thrown across the Goper at that point. The sites of the four dams that would in such case be necessary are figured from I. to IV. on the accompanying plan of the basin.

13. No. I. is the most eastern of the four. Its lowest point is only 52 feet above the Puspolee datum. No. II. is the gap through which the old Tanna road enters the Vehar Basin. Its bottom is 56 feet above the Puspolee datum. No. III. is the gorge of the Goper at the Puspolee datum; and Dam No. IV. is thrown across the head of the adjoining Valley of Marole, for the purpose of covering a breach in the separating ridge between that valley and the gorge of the Goper, which occurs about 464 yards north of the site of Dam No. III.

14. The lowest point of this breach in the separating ridge is only 48 feet above the Puspolee datum, and the gap is too wide, and its edges too sharp, to admit of damming. Fortunately, however, the Marole Valley suddenly contracts a few hundred yards below this breach, and this contraction affords a site for a Dam, figured IV. in the plan. This dam would, however, be considerably more costly than the one across the Goper at the Puspolee datum.

15. About 707 yards north of this breach the gorge of the Goper attains its minimum width. This is the second of the two sites I mentioned

But by excluding the lower portion of the Basin for the Reservoir, and damming across the Goper at the Syce Site, the principal of these four Dams may be avoided altogether;

And the enclosed Reservoir would still contain Storage-room for Nine Thousand Million Gallons, which is ample for the wants of Bombay.

in para. 6, and is numbered V. in the plan. It is the point at which I propose to dam the Goper across.

16. By adopting this as the site of the dam across the Goper, the Marole dam (the costliest of all) would be avoided; and though the storage capacity of the reservoir would not be so great as if the dam were situated at the Puspolee datum, lower down the valley, it would nevertheless be equal to 9,117,514,470 gallons, and therefore ample for the Water Supply of Bombay.

17. On the other hand, it may be said that the portion of the valley

Two Estimates have been prepared: the first, for a Reservoir with four Dams, includes the whole of the Vehar Basin, and a portion of the Valley of Marole; and the second for a Reservoir with three Dams, and excludes the lower portion of the Basin.

situated between the two sites is, in respect to its great average depth, the most valuable portion of the basin for water-storing purposes; that this storage-room would be lost if the upper site was adopted, and that a considerable area of gathering-ground would also be lost: and to meet these objections, I shall estimate for a reservoir having its dam across the Goper at the Puspolee datum, as well as for that which I recommend.

18. I have already in my former Report (see paragraphs 280, 281, and 282, and paragraph 24 of the Appendix,*) given my reasons for calculating the Water Supply required for Bombay at the rate of 20 gallons per head per diem, or 4,000,000,000 gallons per annum. As, however,

* "280. It may be objected to such recommendations and conclusions, that the proposed supply is in addition to all existing sources of supply, and that I therefore exaggerate the wants of the place, in assuming that so large an amount as 20 gallons per head per day ought to be provided.

"281. In answer, I would refer to the table (A) I have given (paragraph 42) of the statistics of all the Water Companies regarding which authentic information is obtainable, and to the engineering evidence regarding the supply of towns taken by the various Parliamentary Commissions on the subject, to show that 20 gallons per head per day is the minimum that any engineer or practical man acquainted with the subject has ever recommended in designing waterworks for any town; and that the average delivery of all the Water Companies of which authentic particulars can be obtained is 24 gallons per head per day, and in the more recently constructed works half as much again; and that these supplies have for the most part been recently introduced in towns which were previously supplied by well-water much better than Bombay is supplied at present, inasmuch as they had no dry season in which these wells failed.

"282. I am certain that no English engineer at all conversant with the subject of Water Supply would, in designing works for the supply of Bombay, calculate the amount required under existing circumstances at less than 20 gallons per head per day: if it was considered inexpedient to supply the whole of the quantity in the first instance, the complete works should nevertheless be estimated for, and whatever portion of them was executed in the first instance should be constructed with a view to the ultimate provision of a delivery of at least 20 gallons per head per day to the whole population. There is no reason whatever why the supply of a town of half a million inhabitants, and within the Tropics, should be less than the average supply to third or fourth-rate Scotch or English towns, and there are many valid reasons why it should be greater."

These statements as to what English engineers would consider requisite at Bombay have been fully borne out by the estimates for the Water Supply of Calcutta that have been since published in No. X. of "Selections from the Records of the Bengal Government." These estimates (of which I have given an abstract in the Postscript to my former Report) are by Mr. Simms, C. E., Consulting Engineer to the Government of India, by Mr. Hawksley, C. E., Engineer of the Nottingham Waterworks, and a high authority on the subject of Water Supply, and Captain Young, of the Bengal Engineers; and all these gentlemen concur in rating the additional requirements of the population they propose to supply at 30 gallons per head per day. Yet a glance at the maps of Bombay and Calcutta will show that the existing sources of supply are at least five times more abundant in the latter town than in the former.

"24. * * * It may therefore, I think, be conceded, that the main conduit, and all other portions of the proposed Bombay Waterworks, that would not economically admit of future addition, should be constructed in the first instance of capacity at least adequate to the supply of 20 gallons per head per day for a population of half a million; for though the census may possibly have overrated our present population, there can be no doubt that the extension of railways and electric telegraphs from the port of Bombay into the interior will, before very long, augment enormously both the business and the population of the place."

Twenty gallons per head per day would be considered a scanty supply in England at the present time. It has been proposed to supply the population of Manchester at the rate of 142 gallons per head per day. Ancient Rome was supplied by 20 aqueducts (according to Victor), whose united volume of water is said to have exceeded 500,000,000 of gallons daily. (It is set down for only nine of them at 376,834,379 gallons daily.) Supposing the population of Rome to have been two millions, this supply would be at the rate of 250 gallons per head per day.

there is some difference of opinion at Bombay on this point, I beg that it may be submitted to Mr. Robert Stephenson, or to any other English civil engineer of eminence, who has given attention to the subject of Water Supply. The compilation published by Government on the subject of the Water Supply of Bombay will afford any such referee ample data for deciding the question.

19. I shall at present assume the amount of water required for the supply of Bombay at 4,000,000,000 gallons per annum, and that it is necessary that storage-room

Four Thousand Million Gallons per Annum required for the Supply of Bombay, at the rate of Twenty Gallons per Head per Day.

The Goper Valley is adequate to the collection and to the storage of a larger Supply.

be provided, after allowing for evaporation for at least nine-twelfths of this amount, or 3,000,000,000 gallons; and I shall proceed to show that the net available rain-fall over the area draining into the Goper above Puspolee is more than adequate to the supply required, and that the Valley of Vehar

admits of the formation of a reservoir of the necessary water-storing capacity, at a very moderate cost in proportion to the amount of water stored.

20. In my former Report of the 22nd December 1852, I calculated the rain-fall on the area draining into the nulla at

Rain-fall on the Gathering-grounds.

Vehar at 76 inches per annum. This was the fall of rain at the Colaba Observatory on the average of

the preceding thirty-four years. A rain-fall of this amount on the area of the Vehar gathering-grounds would be sufficient for the supply of Bombay: but the pluviometrical returns of the Colaba Observatory do not fairly represent the rain-fall of Bombay, and still less that of Salsette.

21. In 1849, 1850, and 1851, Dr. Buist, Major Turnbull, of the Bombay Artillery, and Mr. Mayes, made a very elaborate series of experiments on the subject of the rain-fall over the island of Bombay, with 15 rain-gauges, fixed at different localities. Dr. Buist informs me that the result obtained was, that the lightest fall was near the Colaba Observatory (which is situated on a bare spit of land running into the sea at the southern extremity of the island); that the fall increased materially to the northward as the high and wooded island of Salsette was approached, being heavier at Sewree by nearly a third than at the Observatory; * that the observations were all taken with great care, and that their accuracy might be relied on.

22. These experiments would alone justify me in assuming the average rain-fall on the Vehar gathering-grounds at, at least, 100 inches;

* This would make the average rain-fall at the north of the island of Bombay about 100 inches.

but the pluviometrical observations taken at Tanna (the capital of Salsette) in the years 1844, 1845, 1846, and 1847,* afford more direct evidence on the point, for the mean distance of the Vehar gathering-grounds from Tanna is only $5\frac{1}{2}$ miles, while its distance from the Colaba Observatory is upwards of 20 miles.

23. The rain-fall at Tanna and at the Colaba Observatory during the years 1844, 1845, 1846, and 1847, was as follows:—

Average Rain-fall at the level of the Sea at Tanna, $5\frac{1}{2}$ miles from the Gathering-grounds, from 106 to 124 inches per annum.

	1844.	1845.	1846.	1847.	Mean.
Tanna	98·54	87·83	133·97	104·83	106·54
Bombay.....	65·40	54·73	87·48	67·31	68·73

It will be seen that the mean rain-fall of these four years at the Colaba Observatory was little more than six-sevenths of the average of the last thirty-four years. If the same was also the case at Tanna, the general fall there would be about 124 inches.

24. It is uniformly found, that in high districts the fall of rain is greater than in low districts. The rain-gauge at Tanna was at the sea level : the mean level of the Vehar gathering-grounds is at least 300 feet higher, and the wooded ranges which surround them on three sides are from 800 to upwards of 1,000 feet in height.

25. It is certain, therefore, that the rain-fall over the Vehar gathering-grounds considerably exceeds that at Tanna, and that in assuming it at 100 inches I am considerably within the truth.

26. The experiments of the Scotch engineers on the subject have shown that from six-tenths to eight-tenths of the total rain-fall on gathering-grounds is available to the filling of the reservoirs into which they drain.

27. Mr. Thom, a hydraulic engineer of great experience, and the designer of the earliest water-works supplied from surface collection, states, that both at the Paisley and at the Greenock Waterworks, he has ascertained that about eight-tenths of the whole rain-fall was made available to the reservoirs ; and that at Rothesay, where the declivity of the ground was less, and its surface more broken and porous, the proportion available was six-tenths of what falls there. Another hydraulic engineer of experience, Mr. Stirrat, states that at Greenock, with a rain-fall of 54 inches, 36 inches

* Transactions of the Medical and Physical Society of Bombay.

(or 666 of the whole) were available for delivery, and that at the gathering-grounds of the Shaw Waterworks, near Paisley, out of a rain-fall of 65 inches, 42 inches (or 646 of the whole) were found available. Mr. Stirrat gives a third instance, where the available rain-fall was found on the average of years to be seven-tenths of the total rain-fall, and he considers it necessary (if it be an object to save all of the rain-fall that is available) that storage-room should be provided for at least two-thirds of the whole.

It is calculated that at least six-tenths will be available in the present instance.

28. Six-tenths of the rain-fall in the Vchar gathering-grounds may be therefore considered available to the supply of storage reservoirs.

29. The area draining into the Goper above the site of the Puspolee dam is 4,231½ acres, or 6.611 square miles; and if that site for the Goper dam is adopted, 451 acres will be added from the Marole Valley, making the total area of the gathering-ground 4,682½ acres, or 7.316 square miles.

30. But in case the Goper be dammed across at the upper site, this amount will be diminished to 3,948 acres, or 6.168 square miles.

31. The following table exhibits the amount annually available for storage, with a rain-fall of 100 and of 124 inches over the respective contributing areas of the two reservoirs :—

With a total Fall of	The Proportion available, six-tenths, will be	Fall per Acre.	Fall per Square Mile.	On Gathering-grounds of large Reservoir=4,682½ Acres.	On Gathering-grounds of small Reservoir=3,948 Acres.
Inches.	Inches.	Gallons.	Gallons.	Gallons.	Gallons.
100	60	1,357,329.6	868,690,944	6,355,211,091	5,358,737,260
124	74.4	1,683,088.7	1,077,176,768	7,880,461,731	6,644,834,187

32. If necessary, the area of the gathering-grounds might be very considerably enlarged, by the extension of catch-

If necessary, the Area of the Gathering-grounds might be considerably enlarged; it is not necessary that the Reservoir should be filled in the first Monsoon.

water drains along the western slopes of the hills, both on the west and on the north of the reservoir. There is no objection to the capacity of the reservoirs exceeding the available rain-fall of a single year; there is no occasion that they should be filled

during the first monsoon. All that is required is, that the available annual rain-fall should exceed the annual consumption and waste, so that there may be a surplus to make up for a bad monsoon. But I am of opinion that it would be desirable to increase the gathering-grounds of the reservoir to about 5,500 acres, the cost of which I estimate at £5,000.

33. I shall now proceed to consider the storage capacity of the Vehar Basin.

Storage Capacity of the larger and of the smaller Reservoir, at different Water-levels.

Plan No. II. is a contoured survey of the basin, plotted to a scale of 200 feet to an inch, the vertical equidistance between the contours being 4 feet.

34. The following tables will exhibit the contents at different water-levels, first of a reservoir with its main dam on the Puspolee site, and secondly of a reservoir with its main dam on the Syce site :—

*Table exhibiting the Contents at different Water-levels of a Reservoir with its Main Dam on the Puspolee Site.**

	The Reservoir contains in Gallons		The Reservoir contains in Gallons
Under Puspolee datum.....	65,436	Up to the height above Puspolee datum of	44 feet. 1,257,303,536
Up to the height above Puspolee datum of	4 feet. 2,211,886	Ditto ditto,	48 do. 1,740,523,292
Ditto ditto,	8 do. 8,389,493	Ditto ditto,	52 do. 2,340,381,323
Ditto ditto,	12 do. 18,598,281	Ditto ditto,	56 do. 3,051,952,964
Ditto ditto,	16 do. 40,273,625	Ditto ditto,	60 do. 3,875,238,293
Ditto ditto,	20 do. 80,850,874	Ditto ditto,	64 do. 4,802,988,065
Ditto ditto,	24 do. 146,081,554	Ditto ditto,	68 do. 5,827,952,890
Ditto ditto,	28 do. 245,424,843	Ditto ditto,	72 do. 6,950,132,838
Ditto ditto,	32 do. 389,879,761	Ditto ditto,	76 do. 8,186,348,717
Ditto ditto,	36 do. 595,170,590	Ditto ditto,	80 do. 9,553,421,335
Ditto ditto,	40 do. 880,608,802	Ditto ditto,	84 do. 11,051,351,036
		Acres. Yards.	
At 80 feet above Puspolee datum the area of the large reservoir.....		1,319	1,100
At 84 feet ditto ditto ditto ditto		1,439	3,568

** Gathering-grounds of Larger Reservoir.*

	Acres.	Yards.
The Vehar Estate contains.....	4,190	3,872
Add for ground on the north-east, beyond the boundary of estate, but within water-shed	115	4,290
Add for ditto on the south-west, ditto ditto ditto ditto	144	4,290
Add for ground in the Marole Valley.....	451	829
	4,902	3,751
Deduct for ground along the western side of the estate, within its boundary, but beyond the water-shed	220	3,080
Leaving the total contents of the gathering-grounds	4,682	. 671

*Table exhibiting the Contents at different Water-levels of a Reservoir with its Main Dam on the Syce Site.**

			The Reser- voir contains in Gallons				The Reservoir contains in Gallons
Up to the height above Puspolee datum of	4 feet.	.....		Up to the height above Puspolee datum of	48 feet.		1,159,660,328
Ditto ditto,	8 do.	.....		Ditto ditto,	52 do.		1,641,860,106
Ditto ditto,	12 do.	.....		Ditto ditto,	56 do.		2,215,687,185
Ditto ditto,	16 do.	3,855,302		Ditto ditto,	60 do.		2,881,141,640
Ditto ditto,	20 do.	15,421,208		Ditto ditto,	64 do.		3,632,668,316
Ditto ditto,	24 do.	40,119,219		Ditto ditto,	68 do.		4,464,711,984
Ditto ditto,	28 do.	88,009,973		Ditto ditto,	72 do.		5,377,272,680
Ditto ditto,	32 do.	168,713,974		Ditto ditto,	76 do.		6,391,022,435
Ditto ditto,	36 do.	298,285,505		Ditto ditto,	80 do.		7,526,633,254
Ditto ditto,	40 do.	497,701,627		Ditto ditto,	84 do.		8,784,105,511
Ditto ditto,	44 do.	779,737,068		Ditto ditto,	88 do.		9,117,514,470

				Acres.	Yards.
At 80 feet above Puspolee datum, the area of the small reservoir..				1,101	4,481
At 84 feet ditto ditto ditto ditto				1,214	734
At 88 feet ditto ditto ditto ditto				1,242	1,007

35. If the Puspolee site for damming across the Goper be the one adopted, I am of opinion that 80 feet above the Puspolee datum would be the most advantageous height for the high-water level. At this height the reservoir would contain 9,553,421,335 gallons, would cover 1,319½ acres, and the cost of its dams and waste-weirs would be £35,700, being at the rate of £3 14s. 8½d. per 1,000,000 gallons stored.†

36. The high-water level might be increased to 84 feet, but not higher, without inconvenience. At this height the reservoir would contain 11,051,351,036 gallons, would cover 1,439½ acres, and the cost of its dams

** Gathering-grounds of Smaller Reservoir.*

		Acres.	Yards.
The Vehar Estate contains.....		4,190	3,872
Add for ground on the north-east, beyond the boundary of estate, but within water-shed.....		115	4,290
		4,306	3,322
		Acres.	Yards.
Deduct for ground along the western side of the estate, within its boundary, but beyond the water-shed	220	3,080	
Deduct at south-western extremity of the estate	138	330	
		358	3,410

• Leaving the total area of the gathering-grounds..... 3,947 4,752

† I have not estimated for the land. Government bought the Vehar Estate, containing 4,190 acres 3,872 yards, for £15,000, of which will be occupied by the reservoir I have recommended 1,242 acres 1,007 yards, leaving 2,958 acres 2,865 yards; but the land taken is the most valuable in the estate. It is principally grass land, but contains a good deal of rice cultivation.

and waste-weirs would be £43,445, being at the rate of £3 18s. 7½d. per 1,000,000 gallons stored.

37. If the Syee site be selected for the principal dam, I consider that the most advantageous height for the high-water level would be 85 feet above the Puspolee datum. At this level the reservoir would contain 9,117,514,470 gallons, would cover 1,242½ acres, and the cost of its dams and waste-weir would be £17,411, being at the rate of £1 18s. 2½d. per 1,000,000 gallons stored.

38. In my former Report on the subject of Water Supply, I assumed that the Observatory experiments at Bombay would indicate with tolerable correctness the loss of the proposed reservoir from evaporation; but I find that hydraulic engineers in England are generally of opinion, that the small scale experiments on evaporation carried on at Observatories give results considerably in excess of the actual loss of large reservoirs from the same cause. Thus, while it is stated that the evaporation of Greenwich Observatory is equal to 5 feet a year, Mr. Hawksley gives a rule for calculating the loss from evaporation, in which he states that it varies from 9 to 16 inches per annum only. Another hydraulic engineer of experience, Mr. Stirrat, states that there is no evaporation at all in large reservoirs.*

39. This last opinion is of course erroneous; but it is probable that, especially in hot climates, the impossibility of keeping the water in a small evaporating dish below the temperature of the air (which often exceeds 90°) may give results much in excess of the actual loss from evaporation in a reservoir from 60 to 80 feet deep, containing nearly 10,000,000,000 gallons, and sheltered from the wind on all sides by precipitous wooded hills.

40. I have, however, thought it best to provide for a rate of evaporation equal to the result of the Bombay Observatory experiments, namely .26 of an inch per diem during the dry months. This would amount to 5 feet 2 inches between the 1st October and the 1st June.

41. From experiments made during 1851 (see *Bombay Times' Almanac* for 1852, Part I. page 112), it appears that in the first month of the monsoon the evaporation diminished to 2.89 inches *a month*: the total

* "It is a great mistake to imagine that evaporation takes place to any extent, even in the height of summer, from the surface of a reservoir where the water is of any considerable depth. The deposit of dew, I think, counterbalances it. I have one pond 10 feet deep, on which I made the experiment, and found, in the heat of summer, that in two months it did not go down one-sixteenth part of an inch; and there might have been a small escape to account for even that diminution."—*Mr. Stirrat's Evidence, Appendix No. II. (Engineering Evidence) Report on the Supply of Water to the Metropolis.*

evaporation may therefore be approximately taken at Bombay at .26 a day from 1st October to 1st June ; or 5 feet 2 inches for the eight fair months, and 3 inches per mensem during the rains—altogether 6 feet 2 inches per annum.

42. The evaporation from the reservoir, while the rains are falling, may be neglected ; and as the Goper continues to run till the end of January, there is reason to expect that its flow will be sufficient to repair the waste from evaporation during October and November, or, at any rate, to make up for the evaporation of October.

43. I shall, however, assume the evaporation to which the lake will be exposed at 60 inches, or 5 feet per annum. At such rate, the loss from this cause will be represented by a layer of water 5 feet in thickness, having its upper surface equal to the high-water surface of the lake, and its lower surface equal to the low-water surface of the lake.

Evaporation assumed equal to 60 inches (5 feet) during the eight dry months.

Amount on this scale of Annual Loss from the larger Reservoir, with its high-water level at 80 feet, would be 1,505,536,406 Gallons.

44. The high-water surface of the larger reservoir at the 80 feet contour would be 57,465,540 square feet : assuming the low-water level to be 16 feet below it (or at the 64 feet contour), the low-water surface would be 39,167,093 square feet ; and this would make the annual loss from evaporation equal to 1,505,536,406 gallons.

45. In the same manner, the annual loss of the same reservoir, *were its high-water level raised to 84 feet*, would be as follows :—High-water surface at the 84 feet contour = 62,714,956 square feet ; surface of low-water level at 70 feet contour = 45,016,843 square feet ; loss from evaporation 1,678,461,412 gallons.

46. Similarly calculated, and taking the high-water surface of the smaller reservoir at 85 feet = 54,110,584 square feet, and the surface of the low-water level at the 68 feet contour = 34,992,859 square feet, the loss from evaporation would be 1,388,231,751 gallons per annum. The low-water levels will, I believe, be rather lower than this in each case ; but the lower they are, the smaller will be the mean evaporating surface, and, consequently, the annual loss from evaporation.

47. Fears have been expressed at Bombay, that the infiltration of the contents of the reservoir into the subjacent strata will occasion a very serious annual loss. I am happy to say that there are no grounds whatever for such apprehensions.

No apprehension need be entertained of any material loss from Leakage.

48. Thousands of similar reservoirs, many, as that at Saugor, on a very much larger scale than has ever been attempted in Europe, have been successfully constructed by Native engineers in Rajpootana, and

By far the largest Works of the kind ever constructed have been executed by Native En-

engineers in Rajpootana, and Central and Upper India, without the occurrence of Leakage.

Upper and Central India, and similar reservoirs are constantly constructed in Europe for a variety of engineering purposes, such as the supply of the summit levels of canals, the water supply of towns, and for the feeding of water-wheels; and rules for calculating the drainage area required for filling such reservoirs, for calculating the loss from evaporation, and for the construction of their dams, whether earthen or of masonry, are given in most standard English and French engineering works; but no rules are given for calculating the loss from leakage through the underlying strata. It is always assumed that there will be no material leakage, if the natural surface of the ground be undisturbed, and the dam properly constructed; and the few instances in which any considerable leakage has occurred in reservoirs constructed by English engineers in India can be accounted for by the insufficient mass, and the loose structure of the dams by which they were confined. These faults have been evidenced in the case of the lakes at Mahableshwur and at the Neilgherries, by the failure of their respective dams.

49. There must be always some degree of infiltration, varying, of course, with the nature of the soil and sub-soil; but the loss under this head is never a very material one, and the soil and sub-soil at Vihar are of an unusually retentive character.

50. Most similar European reservoirs are constructed in the region of the stratified rocks, which generally abound in fissures and dislocations, called faults; but the rock underlying the Vihar Basin is unstratified, being solid trap, and is generally overlaid in the bottom of the basin by some feet of plastic clay.

51. After allowing for the 3,000,000,000 gallons consumed during the eight dry weather months, and also for the maximum amount of evaporation, I have, however, left a margin in the case of the smaller reservoir of 4,729,282,719 gallons per annum available to the making good any loss from infiltration; and if that should be deemed insufficient, the larger reservoir, with its high-water surface at the 80 feet contour, might be adopted, in which case the margin, after allowing for the supply of Bombay, and for evaporation, would be increased to 5,047,884,929 gallons. Or the high-water level of the same reservoir might be raised to 84 feet, which would make the margin 6,372,889,624; and if this were thought too little, I have selected, about 700 yards north of the upper extremity of the reservoir, a site where a dam might be economically thrown across the valley leading towards the Kennery Caves, which would pond back about 700,000,000

"Soakage" is not even noticed as a source of loss in any of the Engineering Formulae relating to the design and construction of Reservoirs.

The Soil and Sub-soil at Vihar are of unusually retentive character.

Large Surplus in the Reservoirs sufficient to make up for an enormous amount of Leakage; and there will be no difficulty in Damming.

gallons additional, and increase the margin for soakage to 7,072,889,624 gallons!*

52. Dams for reservoirs may be executed either in earthwork or in masonry. I have adopted the former material as the more economical of the two. It is also that usually employed in Great Britain.

Advantages of Earth-work over Masonry as a Material for Dams.

53. Earthwork dams should be so constructed as to prevent the water from penetrating under and amongst their materials, and they should be formed with a top width of from 13 to 20 feet, and with a slope in front on the side next the water of not less than $2\frac{1}{2}$ or 3 feet of base to 1 foot perpendicular. The water has no tendency to overthrow an embankment of this construction, as the vertical pressure much exceeds the horizontal pressure.

Construction of Earth-work Dams.

54. The earth composing such dams should be laid in courses, each course well watered and rammed, taking care to leave sufficient asperi-

* A large margin is desirable on many accounts; but I do not think that any considerable portion of the margin I propose to leave will be required to make up any loss from "soakage." The following is an example of the extent to which "soakage" is disregarded by English engineers:—

Liverpool is built on a foundation of very permeable sandstone, and, up to 1849-50, was supplied with water by public and private wells therein. The public wells were very large and deep, and were worked by steam-power, some of them producing as much as 1,000,000 gallons per day: altogether, the daily amount they were capable of yielding was about 8,000,000 gallons. Private wells also were numerous. The supply was found inadequate. In the course of 1849 several schemes were brought forward for increasing the supply; and in the beginning of 1850 Mr. Robert Stephenson was requested by the Corporation to report on these projects, and to consider the objections urged against each.

The most eligible of the schemes for the supply of the town was certainly Mr. Hawksley's, who proposed to construct at Rivington storage reservoirs of the capacity of 3,156,000,000 gallons, which reservoirs received brooks, of which the measured daily flow amounted to 25,718,194 gallons; and to bring the water thence to Liverpool through a cast-iron pipe of 44 inches diameter, and twenty miles long, the supply, both on account of domestic consumption and for manufactures, was to be 21,660,000 gallons daily (the population of Liverpool being 286,487). Mr. Hawksley's estimates for engineering works and land amounted to £389,800, of which £213,400 was for the main pipe, £37,400 for land, and £139,000 for the remaining works.

Mr. Stephenson was of opinion that the amount of the estimate should be increased 25 per cent., or to about £500,000. Mr. Stephenson goes at great length into the objections urged against Mr. Hawksley's project. These were—1st, that as the course of the pipe was over an extensive coal-field, it would be liable to fracture by subsidence when the coal was worked away, and that injury might be anticipated to mines from inundations. This objection Mr. Stephenson overrules. The 2nd objection was, that the reservoirs were not capable of yielding so large a supply as was promised by Mr. Hawksley. To ascertain the real state of the case, Mr. Stephenson makes out a daily debtor and creditor account between the reservoir and the daily supply required: all sources of waste in the reservoir are allowed for—escape over the waste-weirs, evaporation, &c.; but no mention whatever is made of any anticipated loss from "soakage." Yet the Rivington Reservoir is situated in the coal-measures, a series well known to abound in faults and dislocations above all others; and this is not an oversight, for the geology of the neighbourhood is fully gone into in the report (which was published by Bradbury & Evans in 1850).

ties or "toothings" upon the face of the different layers to prevent the upper ones from sliding on those beneath them. It is also necessary, either to follow the work rapidly, to prevent the lower courses from drying before the upper ones are added, or, if stoppage is unavoidable, to keep the surface of the work moist, as masonry is kept moist under similar circumstances in India.

55. The slopes next the water of earthwork dams must be consolidated and protected from the lap of the water by a pavement of dry stone-pitching.

56. The top of such dams should be raised at least 4 feet above the flood level of the reservoir, to prevent the waves raised by the wind in traversing so extensive a sheet of water from overtopping the summit of the dam, and thereby occasioning injury to its structure. The landward slopes of such dams should be 2 feet of base to 1 foot perpendicular.

57. Masonry dams require analogous precautions. Care must be taken to break the horizontality of the bed, and the filtration must be prevented as far as possible by stepping the foundation. Such a course also offers a greater resistance to the horizontal thrust of the water, and renders the dam less liable to slip.

58. It is considered necessary to give the masonry dams double the thickness required by the strict application of theoretical rules. The following is the rule given in the *Aide Mémoire* :—

"Representing the height of the water by h , the thicknesses which appear to be the most advisable to give to the dams of masonry at the following points in the height are x , being the thickness sought :

Formula for their Proportions.

"At the top, $x = h \times 0.30$
"In the middle, $x = h \times 0.50$
"At the bottom, $x = h \times 0.70$."

It is remarked that "such thicknesses are, perhaps, rather in excess; but the terrible consequences arising from the bursting of a dam, and the more perfect impermeability of a large mass of masonry, should rather induce a preference in this direction."

59. Masonry dams are seldom constructed in Great Britain, but the rule given in the *Aide-Mémoire* is usually followed by the French engineers, as will be seen by the three examples in the annexed sketch.

60. In the same sketch are exhibited the profiles, and the comparative cost per yard forward of an earthwork, and of a masonry dam over the Goper.

The *Aide-Mémoire* Formula is that generally followed by the French Engineers.

The Earthwork Dam has six times the mass of the Masonry one, and cost only half as much.

61. I have entered into the foregoing particulars regarding the construction and comparative cost of earthwork and masonry dams, because it was originally proposed that the dam across the Goper should be of masonry ; and I believe the idea is general in Bombay that such material would be the cheaper of the two. From motives of economy, masonry dams constructed in India by English engineers are seldom allowed the margin for safety considered necessary in European works of the same description ; and as these Indian works are generally on a small scale, this omission is, perhaps, not of much consequence : but it would not do to run any risk with a dam that confines more than 9,000,000,000 gallons.

62. Drawings IV. V. VI. VII. and VIII. are contoured surveys on a scale of 40 feet to the inch (the vertical equidistance of the contoured lines being 2 feet) of the sites of the several dams, the positions of which are shown in the general plan of the basin.

63. The several dams proposed at Vehar will differ only in height ; they have all a top width of 20 feet, an elevation of 4 feet above the high-water level of the reservoir, an interior slope of 3 horizontal to 1 perpendicular, and an exterior slope of 2 horizontal to 1 perpendicular.

64. The following tables will exhibit the dimensions, cubical contents, and cost of the several dams and waste-weirs required—1st, if the Goper be dammed across at the Puspolce site ; and 2nd, if the Syee site for the main dam be adopted* :—

* The rates allowed for earthwork, &c. in the tables appended to this paragraph are covering ones. The rate for simple work, such as earthwork, and dry stone-pitching, is much lower here than in England ; and I have adopted rates nearly a third lower than the average English prices.

For instance, in Appendix A will be found a statement of the rates at which the different descriptions of work required in such works were executed in 26 different dams, constructed at various English localities ; and at only one was the cost of earthwork so high as the rate I have adopted, viz. 1s. per cubic yard, and in that case it was for a very small job—raising a dam 6 feet ; in three instances the price was only 6d. ; in one 6½d. ; in thirteen from 7d. to 9d. : the average of the twenty-six cases is only 8 ⅞d., or little more than two-thirds of the rate I have adopted. For stone-pitching I have adopted a good English rate ; and in the prescut instance there will be stone admirably adapted to the purpose on the spot.

Again, Mr. Newland, in his elaborate estimate for the Liverpool Waterworks, states that the aggregate cost of the Warland, Chelbourn, Lightharzes, Whiteholme, Hollingworth, and Blackstone Edge Reservoirs, containing together 1,411,747,289 gallons, and covering 407 acres with water, amounts to almost exactly 1s. per cubic yard upon the solid measure of the embankment, and comprises the entire expense of earthwork, puddle, pitching, and weirs, but not of land. I have taken the earthwork alone at 1s., and estimated separately for the waste-weir and stone-pitching.

Table showing the particulars of Cost of each Dam required in the formation of a Reservoir having its Principal Dam at the Puspolee Site, and its High-water Level and Waste-weir at 80 feet above the Puspolee Datum.

Items.	Dam No. I.		Dam No. II.		Dam No. III.		Dam No. IV.		Waste-weir.		Grand Total.
	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	
Extreme height	32	£ ...	28	£ ...	84	£ ...	76	£ ...	...	£ ...	£
Extreme top length	756	...	423	...	792	...	1,405	...	...	...	...
Masonry work, cubic yards, at 12s. per cubic yard .....	...	...	...	...	...	...	...	...	522	313	...
Earthwork, cubic yards, at 1s. per cubic yard	60,523	3,026	17,994	899	197,504	9,875	353,891	17,695	1,386	69	...
Rough stone pavement on inner slope, square yards, at 1s. 6d. per square yard	5,586	419	2,499	183	12,143	911	22,862	1,715	2,870	215	...
Macadamized road above top, square yards, at 1s. per square yard	1,680	84	940	47	1,760	89	3,122	156	...	...	...
Total .....	...	3,529	...	1,134	...	10,874	...	19,566	...	597	35,700

Table showing the particulars of Cost of each Dam required in the formation of a Reservoir having its Principal Dam at the Puspolee Site, and its High-water Level and Waste-weir at 84 feet above the Puspolee Datum.

Items.	Dam No. I.		Dam No. II.		Dam No. III.		Dam No. IV.		Waste-weir.		Grand Total.
	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	
Extreme height	36	£ ...		£ ...	88	£ ...	80	£ ...	...	£ ...	£
Extreme top length	808	...	467	...	834	...	1,450	...	...	...	...
Masonry work, cubic yards, at 12s. per cubic yard .....	...	...	...	...	...	...	...	...	522	313	...
Earthwork, cubic yards, at 1s. per cubic yard	79,700	3,985	27,385	1,369	247,087	12,354	422,733	21,137	1,386	69	...
Rough stone pavement on inner slope, square yards, at 1s. 6d. per square yard	6,721	504	3,155	237	13,311	999	24,892	1,867	2,870	215	...
Macadamized road above top, square yards, at 1s. per square yard	1,795	90	1,038	52	1,853	93	3,222	161	...	...	...
Total ....	...	4,579	...	1,658	...	13,446	...	23,165	...	597	43,445

Table showing the particulars of Cost of each Dam required in the formation of a Reservoir having its Principal Dam at the Syce Site, and its High-water Level and Waste-weir at 85 feet above the Puspolee Datum.

Items.	Dam No. I.		Dam No. II.		Dam No. V.		Waste-weir.		Grand Total.
	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	Quantity.	Amount.	
		£		£		£		£	£
Extreme height	37	...	33	...	78	...	...	...
Extreme top length	821	...	478	...	728	...	...	...
Masonry work, cubic yards, at 12s. per cubic yard .....	...	...	...	...	...	...	261	157	
Earthwork, cubic yards, at 1s. per cubic yard	81,574	4,228	29,799	1,490	190,363	9,518	693	35	
Rough stone pavement on inner slope, square yards, at 1s. 6d. per square yard	7,010	526	3,323	219	11,660	875	1,435	108	
Macadamized road above top, square yards, at 1s. per square yard ..	1,821	91	1,062	53	1,618	81	...	...
Total ....	...	4,845	...	1,792	...	10,474	...	300	17,411

65. In respect to their dimensions, the dams proposed at Vehar are considerably within the limits of ordinary engineering practice, as will appear from the following particulars concerning a few such works in France and England :—

France.

Canal.	Reservoir.	Nature of Dam.	Height of Water.	Capacity.
			Feet. Ins.	
Du Midi	St. Fériel ...	Earth and wall.	105 0	223,090,000 cub. feet.
De Bourgogne ...	Gros Bois ...	Wall	69 6	300,510,000 "
" "	Cercey	Earth	39 3	130,900,000 "
Nantes à Brest ...	Vioreau ...	Wall	33 0	262,395,000 "
Du Centre	Torcy	Earth lined ..	36 3	83,300,000 "
De Briare	Grande Rue ..	Earth	26 6	189,000,000 "

England.

Reservoir.	Nature of Dam.	Height of Water.	Earthwork, excluding Puddling, per Cubic Yard.	Puddling, including Material.	Stone-pitching (2 ft. thick), per Square Yard.	Masonry, Rubble, Dry, in Mortar, per Cubic Yard.	Ashlar, per Cubic Foot.
		Feet.	d.	s. d.	s. d.	s. d.	s. d.
Entwistle ..	Earthwork.	108	6 $\frac{1}{2}$	....	0 5 $\frac{1}{2}$	....	....
Forside. . . .	" ..	100	8 $\frac{3}{4}$	1 9	1 4	9 3	1 4
Woodhead ..	" ..	90	9	1 6	1 8	8 0	1 2
Rhodeswood	" ..	80	8 $\frac{3}{4}$	1 9	1 4	10 6	1 6
Belmont ..	" ..	80	8 $\frac{1}{4}$	....	1 7	....	....

66. Though the dams required for the Vehar reservoir are within the limits of ordinary engineering practice, the capacity of even the smaller reservoir will very considerably exceed that of the largest yet constructed in Europe, either for the purposes of Water Supply, or for feeding the summit levels of canals; and from its size, and owing to its large capacity, and also to the peculiarly favourable nature of the ground, the cost per 1,000,000 gallons stored will be excessively small.

67. In Burnell's Rudiments of Hydraulic Engineering, Part II. page 7, it is said:—"It may be interesting to state that the cost of some large canal reservoirs has been about £450 per 1,000,000 gallons of water stored."

68. At this rate the cost of storing 9,117,514,470 gallons in the Vehar Reservoir would be £4,102,881.

Reservoirs have been constructed at some of the Scotch waterworks on favourable ground for less than one-eighth of the rate mentioned by Mr. Burnell; but the rate at Vehar will not be more than one-fiftieth of Mr. Burnell's rate.

69. If the larger reservoir be adopted, the surplus water will escape, over two waste-weirs, a little west of the Marole dam (No. IV.), of the aggregate width of 340 feet; but if the upper site for the Goper dam be adopted, the waste-weir will be on the neck of land immediately west of such dam, and will be also 340 feet wide. At the highest floods, the section of water-way of the Goper at Puspolee is 500 square feet, or about equivalent to a depth of a foot and a half over the width of the waste-weir. Owing to the irregularities and rocky nature of the channel of the Goper, it would be impossible to estimate exactly its discharge in flood when its water-way attains a section of 500 square feet; but it is certain that it is much less than would be due to the discharge of

Waste-weirs 340 feet wide, which, 18 inches over the Basin, will suffice for the discharge of 50,206,448 gallons per hour. Cost of Waste-weir for the smaller Reservoir £157.

similar area over a weir. With a depth of 18 inches, the fall over a waste-weir of 340 feet is 50,206,448 gallons per hour.* The cost of the waste-weirs of the larger of the two reservoirs would be £313, but if the smaller reservoir were adopted only £157.

70. The works required in the neighbourhood of the principal dam, for drawing the water off the reservoir, for regulating its rate of flow, and for filtering, have next to be considered.

Works required in the neighbourhood of Dams.
Their Nature depends on the mode in which the Water is to be conveyed to Bombay.

71. The nature of the works will depend in a great measure on the mode in which the Water Supply is to be conducted to Bombay.

72. There are two systems by which water stored at a distance may be rendered available to the use of a town—
The Gravitation System.

1st.—The gravitation system.

This system can only be adopted when the following conditions are fulfilled :—

When the delivery point of the storage reservoir is sufficiently high to command the highest site in the town where the water is to be delivered, and when the conduit pipe is of iron, and sufficiently strong to resist the pressure of the head so required, and is of adequate size to deliver; under the pressure of such head, the maximum quantity of water required during any single hour in the day.

73. When the gravitation system is adopted, it is therefore of importance, in order to secure the requisite head for high-service, that the level at which the water enters the conduit pipe should be as high above the town to be supplied as possible.

74. 2nd.—The pumping system.

* Table containing the Quantities of Water, in Cubic Feet, that will be discharged over a Weir per Minute, for every inch in its Breadth, when the Depths of the Water from the Surface to the Top Edge of the Waste-board do not exceed 18 inches.

Depth of the Water, in Inches.	Cubic Feet per Minute, according to Du Buat's Formula.	Cubic Feet per Minute, according to Experiments made in Scotland.	Depth of the Water, in Inches.	Cubic Feet per Minute, according to Du Buat's Formula.	Cubic Feet per Minute, according to Experiments made in Scotland.
1	0.403	0.428	10	12.748	13.535
2	1.140	1.211	11	14.707	15.632
3	2.095	2.226	12	16.758	17.805
4	3.225	3.427	13	18.895	20.076
5	4.507	4.789	14	21.117	22.437
6	5.925	6.295	15	23.419	24.883
7	7.466	7.933	16	25.800	27.413
8	9.122	9.692	17	28.258	30.024
9	11.884	10.564	18	30.786	32.710

In this system, the water descends from the storage reservoir, without any pressure at all, by an open canal, or through an open or covered masonry conduit, whose section and inclination are sufficient to ensure the delivery of the quantity required to a supply reservoir situated in the neighbourhood in which the water is to be used, from which reservoir it is pumped by steam-power up a stand-pipe to a sufficient height to command all parts of the town.

The Pumping System.
In this case the head of the storage reservoir above the supply reservoir is of no importance.

75. In comparing the cost of the two systems, it must be remembered that there is no constant charge for pumping in the gravitation system, and the annual cost of pumping up the water to the head required should be therefore capitalized, and added to the first outlay in all cases when engine-power is required.

76. When both systems are equally practicable, and the cost of each would be much the same, the gravitation system is unquestionably preferable.

77. In the present case, the first cost of both the systems would be about equal; but the pumping of the water up the stand-pipes at Bombay would involve a constant charge of at least £5,000 a year,* equivalent, at 5 per cent., to an increase of £100,000 in the first cost of the works. The gravitation system is therefore unquestionably the one to be adopted in the present case, provided the head obtainable is sufficient; and I am of opinion that a sufficient head may be obtained by a new arrangement for the works in the neighbourhood of the dam.

The Gravitation System by far the most economical.
Nature and probable Cost of the Works required between the Reservoir and Main Conduit.

Were these on the usual plan, the Cost would be heavy, and the available Head of Water would not exceed 65 feet.

78. I shall now proceed to consider the nature and probable cost of the works required between the reservoir and the commencement of the main conduit, supposing them constructed on the plan generally adopted in recent works on the gravitation system. If so constructed, the available head of water would be only between 60 and 65 feet.

79. This head would be inconveniently small, and the expense

* In Appendix C I have gone at length into the cost, &c. of the pumping system, giving the first cost, and the cost of working that steam-pumping machinery required, both in England and at Bombay. I have also given all formulæ respecting the area, slope, and general design of the aqueducts, and have shown that the section of the country between Bombay and Vihar is unsuited to the construction of an aqueduct; and that even were it perfectly favourable, the gravitation system at Bombay would nevertheless be the cheapest, and everywhere the most convenient and certain.

A more economical arrangement is therefore proposed, which would also double the available Head.

of works on the usual construction would be greater, than could be well spared at Bombay. I shall therefore propose a new arrangement, by which (without giving up thorough filtration) the head may be increased from 60 or 65 feet to from 130 to 150, and at the same time the cost be diminished by nearly Rs. 1,50,000.

80. The usual arrangement of the works between the reservoir and the conduit pipe is shown in Drawing IX. fig. 1, and consists—

Description of the usual arrangement of the Works between the Reservoir and Main Conduit. (See Drawing IX. fig. 1.)

1st, of an inlet tower at the foot of the inner slope of the dam, containing inlets at different heights, closed or opened at will by sluices worked from the summit of the tower.

2nd, of a gangway, connecting the top of the inlet tower with the summit of the dam.

3rd, of the regulating sluices, situated between the dam and the emission pipe, and the filters.

4th, of the filters.

5th, of the pure-water basin, from which the conduit pipe commences its course.

81. In drawing the water off a reservoir, care must be taken not to disturb the sediment, by establishing a current near the bottom: it is therefore desirable that the water should be always drawn off as near the surface as may be, without allowing the orifice of the inlet to get clogged by particles floating on the surface.

Precautions to be taken in drawing the Water off a Reservoir.

82. There are two arrangements by which these objects are effected more or less perfectly. In the first arrangement (see Drawing IX. fig. 1) the water from the reservoir finds its way into the emission pipe through inlets in a vertical iron pipe, cased in a masonry tower. These inlets, which are three in number, are situated at different heights, and can each be closed

Two arrangements in use for the purpose, for which see Drawing IX.

The Sluice Tower, with Inlets at different heights.

by a sluice, which is worked from the summit of the tower. The tower rises from the foot of the inner slope of the dam, and, for the convenience of those who attend to the sluices, its summit is connected with the top of the embankment by means of a foot-bridge or gangway. The cost of an apparatus of this sort for the Vehar works, including the gangway, would be £1,867.

Cost of the arrangement would be £1,867.

83. In the second arrangement (see Drawing IX. fig. 2) the tower is dispensed with, and a moveable main is substituted, the bottom of which is connected by a hinged

The Jointed Main, with Floating Inlet.

joint with the emission pipe, while the upper orifice, protected by a copper-wire grating, is suspended by means of a float about 3 feet below the surface. Both the upper and lower joints of the moveable pipes are rendered water-tight by a covering of vulcanized Indian rubber ; and the float, with the orifice of the moveable pipe attached, rises and falls between two vertical guide-piles, according to the level of the water in the reservoir.

84. This is the more economical of the two arrangements, but, at the

The latter the cheaper of the two, but more liable to get out of repair.

same time, the most liable to get out of order : it is therefore principally used for drawing the water off upper and subsidiary reservoirs, which admit of being emptied and cleaned without inconvenience.

85. In most modern works on the gravitation system, the rate of flow through the emission pipe is regulated to the

Self-acting Sluice.

hourly varying rate of consumption by an ingenious self-acting sluice. The simplest arrangement of the self-acting sluice is as follows :—

86. The external orifice of the emission pipe which traverses the dam

Its mode of action.

is closed by a flap-valve, weighted like the safety-valve of a steam-engine : to the end of the valve lever a chain is fastened, which passes upwards over a pulley, and then descending, is attached to a float rising and falling in a little iron tank situated underneath the valve. The little tank is connected by a pipe with the pure-water basin, and therefore the water in it always stands at the same level as that in the pure-water basin.

87. The main pipe for supply starts from the bottom of the pure-water basin, which is situated immediately below the filters. When the rate of consumption in the town is increased, the level of the water in the pure-water basin, and in the tank connected with it, falls, and the float of course falls too, and in falling raises the lever attached to the emission valve, and increases the flow of the latter, thereby affording a more plentiful supply through the filters to the pure-water basin, until the supply exceeds the demand, and the level of the water in the pure-water basin and in the float-tank rises again, the weight of the float is taken off the lever of the emission valve, and the discharge of the emission pipe is thereby checked.

88. When the water is carried without a break from the reservoir to

When the Water is carried without any communication with the Air from the interior of the Reservoir to the distribution (as it will be under the new arrangement proposed), no

the point of consumption (as it will be according to the plan I recommend), self-regulating appliances such as has been described are not at all required ; but when the water is brought through the emission-valve into the open air, and then, after passing through the open filters, makes its final start from the bottom of

regulating appliance such as the Self-acting Sluice is required.

the pure-water basin, it is necessary to regulate the flow through the emission-valve to the demand of the town, otherwise, if the supply exceeded the

demand, there would be great waste, and the filters and pure-water basin would be flooded by an excess of unfiltered water; or if the demand exceeded the supply, the pure basin would be drained till the opening of the main conduit pipe was uncovered, and air would then get into the pipes, and the supply would become intermittent.

89. After leaving the regulating sluices, the water is usually led through an open masonry conduit to the filters, and

Filtration : usual construction of Filters.

these are always so arranged as to admit of each filter being cleaned in its turn, without interruption

to the filtering generally. This is effected, either by having two distinct sets of filters, or by providing one supernumerary filter.

90. Water for town supply is filtered once, twice, or three times. If only once, the thickness of the filtering bed is greater; if the water be filtered three times, the first filter bed is very coarse, the second finer, and the third finest of all.

The Cost of Filtration depends on the daily quantity to be filtered, on the number of square yards of filtering surface required for such amount, and on the Cost per square yard of the description of Filter adopted.

91. The cost of filters depends—1st, on the quantity of water to be filtered daily; and 2nd, on the rate per square yard at which the particular description of filter selected may be constructed. In the case of Bombay, the population to be supplied is half a million, and the daily amount, at 20 gallons per head per day, would be 10,000,000 gallons.

The Cost of Filters varies from 18s. to 20s. per square yard; 18s. the rate adopted.

92. The cost of filters varies in England from 18s. to 20s. per square yard; I shall adopt the former rate.

93. If there are three filters in duplicate, as at Gorbal's, 14.498

If the Water was filtered three times, the Cost of the requisite Filters would be £14,498;

square feet must be provided for every 1,000 gallons required to be filtered per day. This is equivalent to a flow of 68.97 gallons per square foot a day. At this rate, the filtering surface required for the

supply of Bombay would be 16,109 square yards, and the cost, at 18s. per yard, would be £14,498.

94. If there were only two filters in each set, and the sets in dupli-

If the Water was filtered twice, the Cost of the Filters would be £11,180;

cate, the daily flow would be at the rate of 89.445 gallons per each square foot of filtering surface, and at this rate the supply of Bombay would require a filtering surface of 12,422 square yards,

and the cost, at 18s., would be £11,180.

95. If Mr. Thom's plan of filter was adopted, the flow would be at the rate of 110 gallons per square foot daily, the area required would be 10,101 square yards, and the cost, at 18s. per yard, £9,090.*

96. The pure-water basin, situated immediately below the filters, will be 20 feet deep, will have a surface of 6,379 square yards, and will cost about £5,400. It is usual to make two pure-water basins, so that one may be cleaned while the other is working; but I do not deem this essential, as there will be little or no sediment in water just filtered.

97. The cost of the work between the dam and the commencement of the main conduit pipe would therefore be, if the usual arrangements were adhered to, as follows:—

Sluice tower.....	£1,499
Gangway thence to top of the bank.....	369
Emission and compensation pipe through the dam.....	1,611
Regulating sluices and conduit.....	3,133
Filters	9,090
Pure-water basin.....	5,400
<hr/>	
Total....	£21,102

98. The arrangement I propose to substitute for the above is shown in Drawing IX. fig 3. It consists of a filtering tower 50 feet diameter inside, rising from the foot of the inner slope of the dam to the same height as the latter.

99. It will be built of a highly porous littoral concrete, found along the west coast of the islands of Bombay and Salsette, and at many other localities along the Malabar Coast.

100. At intervals of 6 feet there will be bond courses of Porcbunder stone pavement in two thicknesses, breaking joint with each other.

101. The floor of the tower will be paved with stone, and thence the main conduit pipe will take its course, its inlet being closed at will by a single sluice.

102. Directly this sluice is opened, the level of the water in the tower will sink, till the pressure is sufficient to force the water through

* Mr. Thom's self-cleaning filter is described in a note to paragraph 160 of my former Report, and is figured at page 1212 of Cressy's Encyclopædia of Civil Engineering.

the porous sides of the tower. I calculate that 2 or 3 feet difference of level will be sufficient for the purpose.*

The gangway will be the same as in the other arrangement, but no sluice tower, regulating sluices, filters, or pure-water basins will be required, and the available head will be only 2 or 3 feet below the level of the water in the lake.

103. The cost of this arrangement will be as follows:—

Tower.....	£2,987
Gangway	369
Main through the dam	946
Total....	£4,302

Being a saving over the cost of the usual arrangement of £16,800; and at the same time giving more head by from 64 to 85 feet.

104. I shall now proceed to consider the material, the diameter, and the thickness of metal of the conduit pipe that is to convey the water from the Vehar Reservoir to Bombay.

Main Conduit Pipe:
its material, diameter,
and thickness of metal.

105. Wrought-iron pipes have lately been introduced instead of cast-iron, the inner face galvanized, and the outer face protected by a coating of asphalte. It has been found, however, "that very serious inconvenience has been attached to their use, because, if by any subsidence of the ground below them the superincumbent weight should compress the pipes, the sectional area would be diminished, without any external indication to show where the interference with the flow existed. In fact, the elasticity of these pipes is an evil. Cast-iron would, under the circumstances supposed above, either not yield to the pressure, or, if the latter exceeded certain limits, it would break, and thus render apparent (by the flow of water) where the injury had taken place." I should doubt the sufficiency of the asphalte coating in this climate. Whether

Wrought-iron Pipes
have not been found to
answer.

A Cast-iron Pipe will
therefore be estimated
for.

* There is another mode by which filtration might in some cases be effected, without sacrificing the full head due to the level of water in the reservoir. This would be by the use of the jointed main for drawing water off the reservoir, shown in Drawing IX. fig. 2, and described in paragraph 83, substituting a floating filter for the floating strainer shown in the figure.

The floating filter should be lined with filtering tiles of Messrs. Ransom and May's patent porous stone. The objections to this arrangement are its liability to get out of order, and the large quantity of water requiring to be filtered. Were the works on a small scale, I believe the arrangement would be an economical and effective one. A floating filter of 20 feet square might be made to yield a filtering surface of 1,000 square feet. Two such floating filters might be employed together, and the filtering surface of the two might possibly be increased to 3,000 square feet; but I believe this would be about the limit, and that such surface would not be sufficient (unless the filtering tiles were made injudiciously thin) for filtering the water required for the daily consumption of Bombay.

these objections admit of being remedied can only be ascertained in England; meanwhile, I shall estimate for a conduit pipe of cast-iron.

106. The diameter of a conduit pipe depends on its length, on the quantity of water it has to deliver, and on the pressure under which the delivery takes place. In the present instance, the length of the pipe will be 25,520 yards, the quantity of water to be delivered 456,621 gallons per hour, and the head about 60 feet, supposing the water, according to the usual practice, enters the conduit pipe from the bottom of the pure-water basin situated below the dam.

107. I have calculated the diameter of the pipe required by seven different formulæ as follows :—

1st.—By Dr. Young's formula, the diameter of pipe* in inches would be 37·17

* 1. Young's rule, deduced from Eytelwein, for determining the diameter of a pipe of given length, to deliver a given quantity of water, under a given head, is as follows :—

Let Q = the quantity delivered per minute in cubic feet = 1,114·3.

l = the length of the pipes in feet = 76,560.

h = the total fall in feet = 60.

d = the diameter of the pipe in inches.

$$\therefore d = \frac{1}{2} (-2·6,515,000 + 2 \log Q + \log l - \log h) = 37·17.$$

2. Beardmore's formula for determining the same :—

Let q = the quantity delivered per second in cubic feet = 18·57.

l = the length of the pipes in feet = 76,560.

h = the total fall in feet = 60.

x = the diameter of the pipe in feet.

$$\therefore x = 0·235 \sqrt[5]{\frac{q^2 \times l}{h}} = 3·1,605 \text{ feet, or } 37·926 \text{ inches.}$$

3. Du Buat's formula for determining the diameter of pipe :—

Let q = the quantity to be delivered per second in cubic inches = 32,088·96.

S = the inclination = $\frac{1}{1276}$.

r = the hydraulic mean depth = $\cdot 25 d$.

d = the diameter of the pipe in inches.

$$d = \sqrt{\frac{q \left\{ \sqrt{\frac{1}{S}} - \text{hyp log } \sqrt{\frac{1}{S} + 1·6} \right\}}{307 \left\{ \cdot 7854 \sqrt{r} - \cdot 07854 \right\}}} = 33·74 \text{ inches.}$$

4. Hawksley's formula for determining the diameter of pipe :—

Let q = the number of gallons to be delivered per hour = 416,666.

l = the length of the pipes in yards = 25,520.

h = the head of water in feet = 60.

d = the diameter of the pipe in inches.

$$\therefore d = \frac{1}{15} \sqrt[5]{\frac{q^2 l}{h}} = 39·59.$$

5. De Prony's formula for determining the diameter of pipe :—

Let q = the quantity to be delivered per second in cubic feet = 18·57.

J = the inclination = $\frac{1}{1276}$.

d = the diameter of the pipe in feet.

2nd.—By Beardmore's.....	37·92
3rd.—By Du Bruat's.....	33·74
4th.—By Hawksley's	39·59
5th.—By De Prony's.....	47·71
6th.—By De Prony's, founded on Du Bruat's.....	48·16
7th.—By Gerney's	48·84

108. It will be seen that the results of these formulæ differ considerably; and under such circumstances it is always safest for an engineer to estimate for the pipe (or whatever else it may be) that would be required by the most unfavourable of the formulæ before him.

109. In my last Report I did not do so; I adopted a formula which stands about the middle of the list—Mr. Hawksley's. In my former Report I adopted Hawksley's Formula. My reasons for so doing were that the tendency of late hydraulic writers had been towards the formulæ which give the smallest diameter,* and that the results of the more recent English experiments (those for instance, of the Metropolitan Commission of Sewers) had been to the same effect; that the results of these experiments appeared to prove that Hawksley's formula was even in excess, and I considered his formula to be the result of extended experience with pipes of large diameter and great length.

110. But since the publication of my former Report, a memoir has been read at the French Academy of Sciences by M. Morin, one of the most distinguished of European experimentalists, on a very important series of But subsequent experiments have fully confirmed De Prony's.

$$\therefore d = \sqrt[5]{\frac{4 q^2}{(63 \cdot 28 \times 7854)^2 J}} = 3 \cdot 9762 \text{ feet, or } 47 \cdot 71 \text{ inches.}$$

6. De Prony's formula, founded on Du Bruat's, for determining the diameter of pipe :—

Let q = the quantity to be delivered per second in cubic inches = 32,088·96.

k = the inclination = $\frac{1}{1276}$.

d = the diameter of pipe in inches.

$$\therefore d = \left\{ \frac{64 q^2}{(3 \cdot 1416) \times 32,088 \cdot 96 k} \right\}^{\frac{1}{4}} = 48 \cdot 16.$$

7. Gerney's formula for determining the diameter of pipe :—

Let q = the quantity discharged per second in cubic feet = 18·57.

C = the constant quantity = 20·43.

λ = the length of pipes in feet = 76,560.

ϵ = the total fall in feet = 60.

d = the diameter of pipe in feet.

$$\therefore d = \sqrt[5]{\frac{q^2 \times \lambda}{\epsilon \times C^2}} = 4 \cdot 0718 \text{ feet, or } 48 \cdot 84 \text{ inches.}$$

* A recent writer on hydraulics, Mr. R. A. Peacocke, C.E., in his "Practical and Experimental Researches in Hydraulics," states that "*Dr. Young's formula, the result of which, the lowest in my list, makes the diameter of pipes required for the delivery of a given amount of water = 5 when 3·5, would suffice.*"

experiments made by M. Darcy, Director of the Public Waterworks of that city, on the flow of water through pipes of different sizes and different materials; and these experiments prove that De Prony's formula accurately represents the flow of water through new and clean cast-iron pipes; that if the internal surface of the pipe be glazed with any resinous substance, the flow is greater than by the formula, but that if the pipe is in the normal condition of those employed in waterworks,—that is, coated with more or less deposit,—the flow is decidedly less than by the formula.

111. With these experiments* before me, confirmed as they are by the authority of a Commission of the French Academy, and by that of so eminent an experimentalist as M. Morin, I cannot estimate for any pipe of smaller diameter than that due to M. De Prony's formula.

Which is therefore adopted.

* These experiments were made at Paris by M. Darcy, Director of the Public Waterworks of that city. A memoir, detailing the methods of experiment, and the result obtained, having been submitted to the Academy of Sciences, a commission of inquiry was appointed, from which has emanated an extremely valuable report, drawn up by M. Morin (the well-known experimenter on friction), and published in the "Comptes Rendus." The experiments have since been published in detail by the Academy of Sciences in the "Mémoires des Savants Etrangers." The principal object of M. Darcy's experiments was to determine—

1st.—The influence of the state of the surfaces on the drainage.

2nd.—The influence of the diameters of the pipes on the resistance.

He used pipes varying in diameter from the smallest ever used for practical purposes, to half a metre, or a little more than 1 foot 7½ inches. The pipes were also of different materials—some of drawn-iron or lead, and some of iron coated with pitch, or of smooth glass; also cast-iron pipes, some of them quite new, some old with deposits, and some old without deposits.

The experimental arrangements were such, that the observer was able to measure the pressure or effectual head of water in the iron pipes at the origin of movement, and at distances of 50 and 100 metres (164 and 328 feet) further on. The differences would give the measure of the loss occasioned by the resistance of the surfaces.

The most important general result deduced from these experiments is, that the nature and the state of the interior of the pipes exercise a considerable influence on the discharge.

It appears, for example, that compared with the formulæ of M. De Prony, iron pipes could with pitch give discharges greater than the calculated results in the proportion of nearly 4 to 3; that glass gives similar results; but that in cast-iron pipes, whose diameter had been only very slightly diminished by deposits, the velocities, and therefore the effective discharges, were decidedly less than the theoretical indications, while after a thorough scouring a perfect agreement became manifest.

The diameters of the pipes seemed also to exercise a more decided influence on the discharge than what had been hitherto assigned to them; for with small diameters the results were less than by the formulæ, while they were greater for large diameters. This influence of the diameters was probably overlooked, as suggested by M. Darcy, from the fortuitous compensation established between the resistance in very thin but smooth pipes, and those of considerable thickness, but encumbered by deposits.

A comparison of the values obtained for the co-efficient which determines the resistance in tubes, differing but slightly in thickness, has shown that their different degrees of

112. The rule for calculating the thickness of cast-iron pipes is given below.* Its application, however, to moderate heads of water, gives a thickness of metal inconveniently small for large castings. Pipes of 41 inches diameter should not be cast thinner than 1 inch, and at this thickness they would, by the rule below, be equal to the pressure of a column of water 145 feet in height.

113. From the reservoir, therefore, until we descend to the depth of 145 feet below its high-water level, the thickness of the pipes should be 1 inch, and for every additional 14 feet of descent an addition of one-sixteenth of an inch in thickness should be made to the metal of the pipes.

114. The following table shows the number, the weight, and the collective length of each thickness of pipe required, and also the total number of pipes required between the reservoir and the Native Town, their total length, and the total weight of them :—

smoothness, and general condition of their internal surfaces, exercise very remarkable effects on the amount of that resistance. Thus, tubes of thin sheet-iron, coated with pitch, of clean cast-iron, and of cast-iron covered with deposits, each having in inches respectively the diameters 7·717, 7·401, and 9·567, gave for B values which varied proportionally from 1 to 1·5, and 3. *This result shows, that in estimating the action of a series of pipes for waterworks, they should be always supposed to have arrived at the normal condition of being coated with more or less deposit, no matter how comparatively smooth they may be at the time of laying them down.*

* *Formula to find the Thickness of Cast and Wrought-iron Pipes, Strength of Plates, and Parts of Engines, &c.*

To find the thickness of cast-iron pipes—

$$\frac{8 P d}{16,000 \times 2} + \frac{1}{8} \text{ of an inch} = \text{thickness.}$$

$$\text{or } \frac{P d}{4,000} + \frac{1}{8} = S.$$

8 = margin for safety.

P = pressure per square inch by head of water.

d = diameter of pipe.

16,000 = about 7 tons of breaking weight nearly of 1 square inch of cast-iron.

2 = two sides of this pipe.

$\frac{1}{8}$ = margin for want of roundness of form and oxidation, &c. $\frac{1}{8}$ inch may in many cases be sufficient.

The above is supposing the pressure to be regular; if this be not so, 10 had better be adopted for the margin for safety.

With wrought-iron 30,000 may be used instead of 16,000 as the breaking weight, or 7,500 instead of 4,000 as the denominator.

Locomotive boilers are usually not more than $\frac{6 P d}{7,500} + \frac{1}{8}$; about $\frac{1}{8}$ to the top of a boiler, $\frac{1}{4}$ to the sides, and $\frac{1}{2}$ to the bottom, should be added with ordinary land-engine boilers.

The strength of plates (flat) used as columns is as the square of the thickness.

The stiffness of them as the cube.

6,112 yards of the Pipe should be 1 inch in thickness; 2,592 yards $1\frac{1}{8}$ inch in thickness; and 16,816 yards $1\frac{3}{8}$ inch in thickness. The whole Length will be 25,520 yards, and the total Weight 16,725 tons 4 cwt.

Inside Diameter of Pipe.	Thickness of Metal of Pipe in Inches.	Equal to the Pressure of a Column of Water in Feet.	No. of Pipes, each Yard long, required of each thickness.	Length required of each thickness in Yards.	Mean Weight of each description of Pipe.	Total Weight of Pipe of each thickness.
41	1	145	1,528	6,112	Cwt. lbs.	Tons. Cwt.
41	$1\frac{1}{8}$	159	648	2,592	48 8	3,672 13
41	$1\frac{3}{8}$	173	4,204	16,816	51 2	1,652 19
					54 26	11,399 12
Total ..		..	6,380	25,520	..	16,725 4

115. The cost of the pipes required depends on the price of iron in England at the time of purchase, and on the rate of freight, both of which rates are constantly varying.

116. The cost of the pipes as delivered at Bombay will be made up of the three following items :—

The Cost of the Pipes delivered at Bombay will consist of three items—the current price of Pig-iron, the cost of Manufacturing, and the Freight to India.

Present price of Pig-iron, at Glasgow, from 66s. 6d. to 68s. per ton.

1st.—The current price per ton of the raw material (pig-iron) at the date of the contract. At Glasgow (the cheapest place for purchasing pipes), the price of pig-iron on the 18th of January (the date of latest advice) was Mixed Nos. 67s.; No. 1, 67s. 6d. to 68s.; No. 3, 66s. 6d.

2nd.—The cost of manufacturing it into pipes, consisting of waste in re-melting, cost of moulding, and casting, and iron

Cost of Manufacturing, including Profit, 28s. to 30s. per ton.

founders' profit for these, 28s. to 30s. per ton, will be ample, even at the present prices of labour. I

have known it as low as 16s. 8d.*

3rd.—The freight to Bombay, and landing. I find that before the

Present Freight to Bombay from 35s. to 40s. per ton; and Hamallage 5s. per ton.

war the machinery shipped to the Colaba Land Company had averaged 25s. per ton; that since the war it has been very variable, and has ranged from 35s. to 45s. per ton; but that at present the

tendency is downwards. This information agrees with what I have

* In Appendix D to this Report I have given the particulars of the contracts entered into in 1850 by the Corporation of Liverpool with certain iron-founding firms of the town and neighbourhood, for supplying the Liverpool Waterworks with a main pipe, 20 miles long and 44 inches diameter. This pipe weighed 28,429 tons, and cost £130,536. The average rate at which it was delivered was therefore £4 11s. 9d. per ton. The price of Welsh pig-iron No. 1, at the time the contract was entered into (December 1849), was £3 10s. and £3 12s. 6d. per ton. The cost of manufacturing, and the founders' profit, could not therefore have averaged more than £1 19s. per ton; and as the price ranged from £4, and in some cases was much lower (for instance the largest contract, that with the "London and Vulcan Iron Company" was only at the rate of £4 6s. 8d. per ton), the profit and cost of manufacturing in this case could not have exceeded 16s. 8d.

learnt regarding the present freights paid for iron and machinery by the Railway Company; I have therefore taken 45s. per ton as the rate of my estimate. * To this is to be added the landing expenses, usually called "hamallage" at Bombay. These, I find from the Railway Office and the Colaba Company, may be taken at 5s. per ton.

At this rate the Cost of the Pipes delivered at Bombay would be £7 8s. per ton.

117. This would make the cost of the pipes delivered at Bombay only about £7 8s. per ton, provided sufficient shipping to Bombay could be obtained directly from Glasgow.

118. I mention

Glasgow is the cheapest place for Pipes; but there is little Shipping employed between that Port and Bombay.

Glasgow, because iron and labour are always cheaper there than at any southern iron shipping port; but the trade from Glasgow to Bombay employs so few ships that there is little chance of obtaining from thence freight for 20,000* tons of iron to Bombay, and ships could not be chartered for the express purpose of carrying the iron, because no vessel can be loaded more than a fourth of her registered tonnage with such dead weight.

119. Under such circumstances, after taking advantage of as much

And at least part of the Freight required must therefore be obtained at Liverpool.

direct freight to India as can be obtained at Glasgow, the remaining pipes must be shipped to Liverpool, and forwarded to India by ships belonging to that port. It is possible that the freight between Glasgow and Liverpool may swell the cost of the Glasgow pipes to that at which they could be obtained at Liverpool, and in this case the order might be divided between the two ports.

120. I am informed by good authority, that the freight between Liverpool and Glasgow does not exceed 7s. 6d. per ton, and this would swell the cost at Bombay (of the portion of the pipes that were not shipped direct from Glasgow) to £7 15s. 6d.

121. On the foregoing grounds, I have estimated the cost of the pipes

On which account the Cost of the Pipes delivered at Bombay is estimated at £8 per ton, instead of at £7 8s.

as delivered at Bombay at £8; and taking into consideration the fact—1st, that a fall has commenced in the price of iron; and 2nd, that the first effect of the war on freights has passed, and that they are now falling, and likely, in the opinion of the merchants I have consulted, to settle down at something considerably lower than the present rate, I think £8 may be considered as a covering rate.

122. At £8 per ton, the cost of the 16,725 tons of 41-inch pipe, as

* Including the street-mains.

Cost of Main Pipe, 16,725 tons, at £8 . . .	£133,800
Laying it, 25,520 yards, at £1 . .	25,520
Total	£159,320

delivered at Bombay, will be £133,800. The cost of laying this pipe (25,520 yards long) I estimate, at £1 per yard, at £25,520 : the total cost, therefore, of the main pipe, including laying, will be £159,320.*

123. It was originally proposed to convey the water from Vchar to a distributing reservoir situated on the top of Nowrojee Hill, a low but steep eminence on the north-east of the Native Town. A distributing reservoir in such a position would, however, be very costly, and could answer no useful purpose whatever.

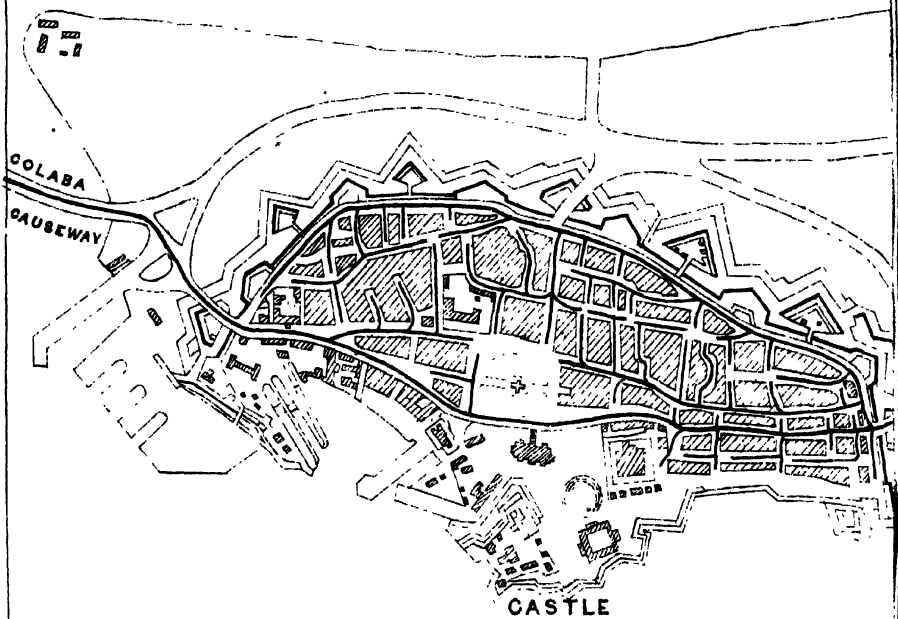
124. The principal object of a distributing reservoir is to allow of the use of a smaller conduit pipe than would otherwise be required ; but if adopted in the present case, it would necessitate the use of a larger pipe than I have estimated for.

125. A distributing reservoir should be a compensation reservoir, whereby the water brought by the pipe may accumulate when the supply exceeds the demand of the town, and *vice versa* ; for the daily demand of the town for water is not equally distributed over the whole twenty-four hours, but nearly the whole is required during the twelve hours of daylight, and very little during the night. Thus the delivery of the pipe is during the night greatly in excess of the demands of the town ; and if a compensating reservoir can be obtained, *which would not materially diminish the head in the main conduit pipe*, and which would itself command a sufficient head for the town, the main conduit

It would increase the Cost of the Works, and diminish the Head of Water available in the Town. might be considerably reduced in diameter, for all night the pipe would be filling the reservoir, and thus the amount accumulated in the reservoir during the night would be available to the daily supply in addition to the delivery of the pipe. But it must be remembered that the delivery of the main pipe depends on the pressure or head under which it takes place, and if, after descending to the general level of the town from a reservoir 155 feet above it, the water again ascends to

* In paragraph 116 I stated that the price of pig-iron in Glasgow on the 18th of January last was from 66s. 6d. to 68s. per ton, and that it was falling ; and in the foregoing estimate I have accordingly taken the price of pig-iron at 68s. But by the price currents extending to the 9th of February, which I have received by the mail since arrived, I find that at the latter date the price of pig-iron at Glasgow was 64s. 6d. to 65s. per ton, being a fall of 3s. per ton on the rate at which I have estimated the pipes.

Including the distribution, the total tonnage of cast-iron piping required will be upwards of 21,000 tons, and a fall of 3s. a ton on this would be equivalent to a saving of £3,150 on the work. It is, however, not worth while to take credit for this saving, as the price may rise again ; however, I think it likely to fall lower first.



GENERAL SK

REDUC

a distributing reservoir 50 feet higher up, it—1st, loses one-third of its head, and *requires a proportionate increase in the diameter of the pipe to enable it to deliver the same quantity of water it did before* ; and, 2nd, the high-pressure jet of water available in the town in case of fire is diminished to one-third its original height. The construction of such reservoir, moreover, would be extremely costly. It should not be of less capacity than a day's supply (10,000,000 gallons). To prevent the contamination of the water, it is essential that it should be covered, and no covered town reservoir has yet been constructed for less than £4,000 per 1,000,000 gallons stored. At this rate, a distributing reservoir on Nowrojee Hill would cost £40,000, and it would cost £20,000 if it contained only half a day's supply.

Distribution.—As the Cost of the Water-works is to be defrayed by a General Rate, the Supply should be brought within the reach of every Inhabitant of the Island.

126. As the return for the outlay on these waterworks is to be defrayed (at least in the first instance) by a rate borne by all the inhabitants of the island, excepting the very poor, it appears to me that the proposed supply should be brought within the reach of every inhabitant of the island.

127. In respect to the level and general character of the inhabited districts, and the mode of distribution most applicable under the circumstances of each, the population may be divided into three classes :—

1st.—The dwellers in all the town districts, comprising about nine-tenths of the population, will be supplied according to the most approved methods of English town supply : pipes constantly full of water at a high pressure, and with fire-plugs, and public stand-pipes at frequent intervals, will be in every street, and no house in any street will be more than 100 feet

The Town Distribution should be constant, and high-service ; and no house in any street should be more than 100 feet from a public Source of Supply.

from a public stand-pipe. These will consist of a row of cocks at a convenient height above the ground, shutting of themselves, but capable of being opened, and held so at will ; the number of cocks varying with the demand for water in their vicinity. Beneath the cocks there will be a sink, communicating with the adjacent drain. No house in any street will be further than 100

Description of the latter.

Plans exhibiting details of Distribution. (Nos. XI. and XII.)

feet from one of these sources of supply. The details of the town distribution are shown in Plans XI. and XII.

2nd.—Village Supply. After entering Bombay, the main pipe will pass on the east the villages and hamlets of Colowree, Bhundarwarra, Agarwarra, Gowaree, Wud-dulla, Nagaun, Bhūminolee, Bhoewarrec, Dhacktee Sewree, Parell village, Sewree village, Sindulpara, and Byculla village ; and on the west Sion

Supply to the Villages within the Island will be by means of Draw-wells, kept full from the Main Pipe.

village, Dhurraree, Mahim Colewarree, Mahim, Matoonga, Maharwada, Bhundarwarra, Kurra, Thacoorwarree, Worlee, Mattarpakaree, Mudchee Pakaree, and Shumboo Madhew Pakaree. All these, with the exception of Mahim, are badly off for water, and they are built on low ground, and do not require a high-pressure supply. I propose to supply them by means of draw-wells, kept constantly full by small stoneware pipes, or masonry conduits, into which the water will be admitted from time to time through sluices in the main pipe, so arranged as to deliver the water without pressure.

3rd.—There remain the bungalows on Malabar Hill, and the Native villages of Walkeshwur and Mahaluxumce.

128. The two villages are badly off for water; and I expect we shall obtain a considerable portion of our eventual income by the sale of water to these bungalows. But, on the other hand, were the water constantly laid on to points so far elevated above the general level of the populous districts, there would be a counter pressure to the head of water in the main pipe, which would diminish its flow.

129. I therefore propose that the supply to this portion of the population should be intermittent, and delivered during the night, at which time the diminution of flow in the main pipe, occasioned by laying on the water to the draw-wells, and public and private cisterns on these hills, would occasion no inconvenience.

130. The branch main leading to these districts will be furnished, near its junction with the main pipe, with two slide-valves, having an interval between them, and when it is desired to shut off the pressure of the water in the hill-main, both these valves will be closed, and the water in the interval allowed to escape; thus, though the branch-main will remain full of water, the head of such water will not affect the flow in the main pipe.

131. The iron pipes required for the distribution to the town districts and to Malabar Hill will be of the aggregate length of 54 miles, and I estimate their cost, at the rate of £800 per mile, at £43,200.

132. This rate (£800 per mile) for street distribution is that adopted in Messrs. Hawksley and Young's estimate for the Water Supply of Calcutta;* and Mr. Hawksley's great experience in such matters, together with the very high rates he has adopted for other items in the same estimate (for instance £210† per horse-

* Selections from the Records of the Bengal Government, No. X. page 45.

† This is more than four times the English cost. Mr. Hocking (one of the principal manufacturers of the Cornish pumping-engine), in his evidence taken in the last Parliamentary Report on the Water Supply of the Metropolis, states that Cornish Engines of largest size would cost, when set to work, about £50 per horse-power.

power for the engines required), warrant the conclusion that the rate is a covering one.

133. The cost of the distribution to the villages I have mentioned in paragraph 126, and also for the public draw-

Cost of Distribution to the Villages. wells at Mahaluxumee and Walkeshwur, will be as follows :—

27 Draw-wells (roofed) at the 25 villages mentioned in paragraph 126, and also at Walkeshwur and Mahaluxumee	£ 405
17,400 yards of masonry conduit for connecting the latter draw-wells with the main pipe, at 5s. 3d. per yard	4,568
Total.....	£4,973

134. The amount of my estimate for the supply of Bombay with water from the Vehar Basin is as follows :—

RESERVOIR, containing, when full, 9,117,514,470 gallons of water, and covering a surface of 1,212½ acres. (See paragraph 37.)

1. Dam No. V. (over the Goper)	£10,474	
Dam No. II.	1,792	
Dam No. I.	4,845	
Waste-weir	300	
(For particulars see paragraph 37.)	————	17,411
2. Cost of CATCHWATER DRAIN, for extending the area of the gathering-grounds of such reservoir (see paragraph 32)	£5,000	
	————	5,000
3. FILTERS.		
Filtering tower	£2,987	
Gangway	369	
Main through the dam	946	
	————	4,302
4. Cost of MAIN PIPE, 41 inches diameter, and 25,520 yards long, extending from storage reservoir to centre of Native Town, weighing 16,725 tons, at £8 per ton.....	£133,800	
Laying 25,520 yards, at £1 per yard (see paragraph 122)	25,520	
	————	159,320
5. Cost of TOWN DISTRIBUTION, including 54 miles of street mains.....	£43,200	
VILLAGE DISTRIBUTION, including 17,400 yards of masonry conduit	4,973	
	————	48,173
		£234,206
Contingencies at 5 per cent		11,710
Total.....		£245,916

My estimate amounts to two hundred and thirty-four thousand two hundred and six pounds ; and to this I have added eleven thousand seven hundred and ten pounds for contingencies.

135. This is exclusive of the 1,242 acres of land required, and also of engineering expenses, as I have no reliable data for determining with exactness the amount of either of these items.

136. It appears, therefore, that the cost of the works will certainly not exceed materially the sum for the interest of which the Bench proposed to make provision in calculating the amount of the taxes required for the purpose.

137. In paragraph 42 of my former Report is a table showing the financial statistics of all the water companies concerning which authentic particulars could be obtained, from which it appears that the cost of the nine London Waterworks had ranged from £1 12s. 3d. to £4 15s. 3d., and had averaged £2 5s. 9d. per head of the population supplied. It has been said that had London now to be supplied anew, and by one company instead of by nine, £1 a head would be found sufficient ; but I am unaware of any instance in which a town population has been actually supplied at so low a figure as this. The estimated cost of the Vchar Waterworks is only about 10s. per head.

138. That my estimate is so much below the cost of similar works in England will, I trust, be considered a proof that I have attended to every practicable economy in the design. I have not obtained this result by taking credit for the low rates of labour in this country, for to every description of work I have applied what I have shown to be covering rates in England, and what the schedules of local rates annexed will prove to be still more covering rates out here ; and for the principal item, the cast-iron pipes, I have estimated at nearly double the rate at which I have shown they have been purchased for English waterworks.

139. I have kept down the amount by reducing the number of parts as much as possible, and discarding all appliances that could be dispensed with without sacrifice of efficiency.

140. But I must most earnestly deprecate any attempts to reduce the cost of the works still further, by reducing the capacity of the reservoir, the diameter of the main conduit, or any other portion of the works, that will not economically admit of future addition. I am satisfied, that were the conduit pipe reduced, it would not (after allowing for the enormous waste always found to take place in such cases) be adequate to the wants of Bombay, and that a great public disappointment would be the result.

141. I am under the impression that the public are generally unaware of the enormous amount of waste found to take place, in even the best constructed waterworks, between the reservoir and the town

supplied. I endeavoured to attract attention to this point in paragraphs 44, 45, 51, 52, and 53 of my former Report.* From them it will be seen, that in all cases the amount of waste very considerably exceeds the amount actually entering into consumption. In London only two-fifths of the whole delivery enters into consumption (and at this rate, an allowance of 20 gallons per head per day at Vohar would be reduced to 8 gallons per head at Bombay).

142. At Paisley, Dr. Sutherland reports the actual consumption of water to be only one-tenth of the actual quantity sent into the mains, and at the Gorbals Works at Glasgow the waste amounts to 18 gallons out of every 32.

* "44. The result of the investigations instituted by the Board of Health has shown that the waste is very much greater than was suspected; that in all cases it considerably exceeds the actual consumption; and that in fact it may be truly stated that at present *the large supplies furnished to towns are required, first for waste, and secondly for domestic supply.*

"45. The total quantity of water delivered by the nine water companies that supply London was ascertained to be 45,000,000 gallons a day; but from careful gauging of the house-drainage, it appeared that only two-fifths of this amount, or 18,000,000, really entered into consumption, the remaining 27,000,000 being wasted by leakage. Of this 18,000,000 (being about 9 gallons per head per day) actually entering into consumption, it was ascertained that 5·7 gallons per head per day was the average domestic consumption of the best conditioned districts, provided with an unlimited supply of water laid on into the interior of their dwellings; the remaining 3·3 gallons being consumed by steam-engines, manufactories, the flushing of sewers, street-watering, and the extinguishing of fires.

"46. This result has been confirmed by similar experiments instituted in other large English towns, and it may now be considered as an ascertained fact. * * *

"51. The enormous amount of waste that occurs in even the best and most recently constructed waterworks may be demonstrated in another way. For many hours of the night there is little or no consumption of water for domestic purposes, and manufactories; and if there was no leakage, the water-pipes under the constant system of supply would remain charged all night, without requiring any addition to their contents; yet at the City of Glasgow Waterworks 3,000 gallons per minute were required to be pumped into the mains to keep them charged during the night. There are 1,440 minutes in 24 hours, and this amount therefore indicates a waste of 4,320,000 gallons a day in works supplying a town population of only 325,000.

"52. The quantity which passes into the mains of the works of the Gorbals Gravitation Water Company (which works are considered the most perfect of the kind in Great Britain) is stated by their Superintendent at 934·50 gallons per minute during the night hours, indicating a daily waste of 1,345,680, or nearly 18 gallons per head per day on the population supplied.

"53. The enormous disproportion that the gross quantity of water supplied usually bears to the actual net consumption is attributed to leakage in the countless joints and fire-plugs of the many miles of the distributing water-pipes, and to the enormous and continuous waste, not only from the stand-pipes, but also from water-taps on 'stair-heads,' and within private dwellings. These latter sources of leakage are very numerous. There are 1,800 stand-pipes, with $\frac{3}{4}$ -inch taps, belonging to the City of Glasgow Waterworks, and besides this, a population of 165,000 supplied within their dwellings by probably not less than 80,000 taps."—(For particulars regarding their waste, see the Report of the Board of Health on the Supply of Water to the Metropolis, in 1850; also the details given in Appendix III. to the same Report, pages 11 to 19.)

143. It is always admitted that it is for the interest both of the public and of water companies that a town should be supplied by a single set of works. There can be no competition between rival water companies, because mains are too expensive to be laid down in duplicate in streets. Two companies, with duplicate works and establishments, cannot therefore do the work so cheaply as a single company could do it, and the public pay accordingly. Yet, notwithstanding this, I cannot recall to mind a single large town in which the first water company was established more than ten years ago, in which a second (and often a third) has not since been found necessary; and this evil is to be attributed to the facts that when the first works were designed the amount of the waste, since found to be common to all waterworks, was not even suspected; that the increased supply of water introduced has been found in all cases to create a greatly increased demand; and that due precautions were not in such cases taken at starting to provide for the extension of the original works, so as to keep pace with the extension of the town.

144. We cannot expect that the Bombay Waterworks will be exempt from the large proportion of waste which is found to exist in even the most recent and perfectly constructed of the Scotch and English waterworks; and surely there never was a town in which there was a more certain and immediate prospect of a great and rapid increase in the population. We have hitherto been separated from the productive provinces of India by the Sahyadree range, and the 70 miles of rock and jungle that form its roots; but these obstacles are about to be traversed, and in a few years we shall be brought within a day's journey of Guzerat, Khandeish, Berar, and Mysore. There are no reasons why Bombay should not increase as rapidly as English towns have increased under similar circumstances, and there are many causes why the ratio of increase should be very much higher in Bombay than in England.

145. But it is asked whether the ultimate expense of the works would be much increased if the dams were not raised to their full height in the first instance, but were completed some years later; and if a main pipe of half the capacity of that estimated for were laid down in the first instance, and a second of the same diameter added when the dams were raised?

146. Were such an arrangement adopted, the works, when thus completed at two heats, would have cost nearly £50,000 more than if they had been *completed* in the first instance.*

* If the reservoir was only constructed in the first instance of one-half of its intended capacity, the saving in earthwork would be represented by a strip of 17 feet in height taken from the top of all the bunds, the value of which, at the estimated rates, would be only £4,610.

Against this is to be taken the cost of erecting a masonry waste-weir, instead of making use of the natural one occurring at the proposed high-water level of the lake, and this would swallow up the saving in earthwork. Moreover, such masonry waste-weir would be of no use

147. The time required for the *completion* of the works I have estimated for will depend on the period occupied by the manufacture and shipment to Bombay of the whole of the cast-iron piping required for the main pipe, and the distribution.

148. The delivery of the pipes required by the Liverpool Works extended over a period of between thirteen and fourteen months, though the order was divided amongst five large firms, whose establishments were in the neighbourhood of the town. It is therefore unlikely that the full number of pipes required in the present instance can be delivered in less than a twelvemonth from the date of the order, and five months must be added to this for their conveyance to Bombay.

149. But arrangements can be readily made for the immediate execution and despatch of the castings required for the works in the neighbourhood of the reservoir. The principal dam might be begun as soon as these castings arrived, and the filtering tower and the two smaller dams might be commenced earlier.

150. In conclusion, I have much pleasure in acknowledging the

when the dams were eventually raised. Also the gangway would have to be altered, and the filtering tower unfloored, unroofed, and raised. These alterations would be very costly, and would occasion great inconvenience and interruption to the supply of pure water to the town.

The cost of the alterations and of raising the dam would be about £6,000. The proposed pipe is 41 inches in diameter; it will weigh 16,725 tons; its cost would be £8 per ton, and that of laying it, at £1 per yard, would be £159,320. Two smaller pipes of the same aggregate capacity would be 29 inches in diameter each, and would weigh 20,438 tons; their cost, at £8 per ton, including laying (at 15s. per yard each), would be £203,284. The cost would be therefore, as I have said, £43,964 in excess in the piping alone, and the small pipe would not, according to the experience of English engineers, be adequate, after allowing for waste, to the supply of Bombay; and the waterworks would be a failure.

Major Crawford appears to agree with me in deprecating the laying down of multiple pipes one after another, instead of laying down *one* large one, in the first instance, sufficient for the present and anticipated wants of the town. In paragraph 7 of his letter to the Chief Secretary, dated 27th August 1850, (page 36, No I. New Series of Selections from the Records of the Bombay Government,) he states, that from the dam of the proposed reservoir at Vehar, he would “lay a main of the largest description which is used, *as this in the end would be much cheaper than laying down several mains of a smaller diameter.*”

There would be also a great commercial advantage in a copious supply of water to Bombay. It is intended in the first instance to obtain a return on the outlay by the imposition of a general tax on all but the poor, who are to have their water for nothing; but it was hoped that this tax would only be a temporary one, and that as soon as a demand for water was established, a handsome revenue would be realized by its sale to manufactories, and rich people with gardens, fountains, and baths.

But if the pipe is so small as only to afford a scanty supply to the public stand-pipes, there will be no surplus for sale, and consequently no income; and under such circumstances the tax must be perpetual. Nor will there be any surplus for sanitary purposes, such as washing the streets, and flushing the sewers.

very able services of Messrs. West, Handcock, and Aher, who joined me at or near the commencement of the surveys, and of Messrs. Matthews and Green, whose assistance I was fortunate enough to obtain towards its termination.

I have the honour to be,

Sir,

Your most obedient Servant,

H. CONYBEARE,

On Special duty, Salsette.

Bombay, 13th March 1855.

APPENDIX A.

ENGLISH RATES FOR THE DESCRIPTION OF WORK
REQUIRED FOR WATERWORKS.MR. HAWKSLEY'S SCHEDULE OF RATES FOR THE
LIVERPOOL WATERWORKS." EARTHWORK. (*Copy of Estimate.*)

Land	£39,408 6s. 6d.
Roddlesworth Reservoir	10d. per cubic yard.
Raike ditto	11d. „
Goit ditto	9d. „
Anglezark ditto	9d. „
Ditto (Side ditto)	11d. „
Ditto (Lower ditto)	10d. „
Rivington Reservoir (Yarrow Embankment)... ..	10d. „
Ditto (Side ditto)	11d. „
Ditto (Lower ditto)	10d. „
Black Lad Road Embankment... ..	9d. „
Leicester Mill Road Embankment	7d. „
Cutting Puddle Gutters (50,000 yards)	1s. „
Puddling (labour only)	6d. „
Stoning slopes, average price	2s. 8d. „
Filter Beds, about 8,000 yards superficial, about 10 feet deep, with 3 feet in depth of gravel, and 3 feet in depth of sand, formed and finished, complete	20s. per sup. yard.
Dry Fence Wall, 4½ feet high above ground, 2 feet wide at bottom, and 14 inches wide at top (about 20 miles)	2s. per lineal yard.
Waste-weirs and Drains	£6,570."

Table showing the Prices at which the Dams of Reservoirs

Items.	Woodhead Reservoir, 90 feet high.		Forside Reservoir, 100 feet high.		Rhodeswood Reser- voir, 80 feet high.		Hollingworth Re- servoir, Armsfield ditto.		Golt Reservoir.		Holdingwood Reser- voir, 40 feet high.		Ellon Reservoir, 35 feet high.		Ratcliffe Reservoir, raising 6 feet.		Shuttleworth Reser- voir, 40 feet high.		Warland Reservoir, 34 feet high.		Runnworth Reservoir, 32 feet high.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Earthwork (exc. puddling), per cubic yard	0	9	0	8 $\frac{3}{4}$	0	8 $\frac{3}{4}$	0	8 $\frac{1}{2}$	0	6	0	7	0	6	1	0	0	6	0	11	0	7 $\frac{1}{2}$
Puddling (exc. material), ditto ....	..	..	..	..	..	..	..	..	..	0	4	0	4	0	6	0	4	0	2 $\frac{3}{4}$	..	..	..
Ditto (including material), ditto.	1	6	1	9	1	9	1	6	..	0	11	0	10	1	6	0	10	1	3	1	6	..
Stone-pitching (2 feet thick), per sup. yard	1	8	1	4	1	4	2	8	..	0	6	1	0	..	1	8	0	11	0	11	2	4
			To be brought 1,200 yds.				To be brought a mile.				On plan.						4 feet thick.					
Masonry, rubble, dry, per cubic yard .....	..	..	..	..	..	..	..	..	..	3	6	..	..	..	..	..	..	..	..	5	3	..
Ditto, in Mortar, ditto	8	0	to	10	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	6	..
Ashlar, per cubic foot	1	2	to	1	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fence Walls 6 feet high, per lineal yard .....	..	..	..	3	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ditto 3 $\frac{1}{2}$ ditto ditto....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ditto 43 ditto ditto....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Water-courses 6 feet deep, 12 feet wide at top, 3 feet wide at bottom, walled sides, flagged bottom, per lineal yard .....	..	..	..	18	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cutting Puddle Trenches, per cubic yard .....	..	..	..	..	..	..	..	..	..	0	7 $\frac{1}{2}$	0	2 $\frac{1}{2}$	..	0	6	0	8	1	0	..	..

NOTE.—The aggregate cost of the Warland, Chelbourn, Lightharries, Whiteholme, Hollingworth, and Blackstone almost exactly 1s. per cubic yard upon the solid measure of the embankment, and comprises the entire expense 50 miles from the sea, dispense on an average of years 32 inches in depth of rain from a water-shed of

have been contracted for in twenty-six English localities.

Belmont Reservoir, raising 16 feet on old Bank, 80 feet high.	Enrieste Reservoir, 108 feet high.	Bolton New Reser- voir, 44 feet high.	Average of actual Contracts.	Roddlesworth.	Raika.	Golt.	Anglezark.	Ditto.	Ditto.	Rivington.	Ditto.	Ditto.	Black Lad Road.	Leicester Mill Road.	Remarks.
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
0 8 $\frac{1}{4}$	0 6 $\frac{1}{2}$	0 8	0 8 $\frac{1}{10}$	0 10	0 11	0 9	0 9	0 11	0 10	0 10	0 11	0 10	0 9	0 7	Materials close to em- bankments.
..	Day- work.	..	0 4 $\frac{4}{10}$	0 6	..	..	..	..	..	..	..	..	..	..	In each embankment.
..	..	2 0	1 4 $\frac{2}{10}$	1 4	1 5	1 3	1 3	1 5	1 4	1 4	1 5	1 4	1 3	Nil.	Puddle stuff in excava- tions.
1 7	5 6 Labour only.	1 4	1 5 $\frac{8}{10}$	1 9	1 9	..	1 9	2 6	1 9	1 3	1 9	1 9	1 6	Nil.	Stone in excavations.
..	..	1 2	..	..	..	..	..	..	..	..	..	..	..	..	First day's work in Rock- dale Canal Locks 1s. per cubic foot; same on Bolton Canal.
..	0 10 $\frac{1}{2}$	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	2 0	..	..	..	..	..	..	..	..	..	..	Round the margin of all Reservoirs. Similar to Belmont Wall, which cost 1s. 4d. per lineal yard.
..	..	0 6	7 1	0 ..	..	..	..	..	..	..	..	..	..	..	The greater part clear of water, and only a few feet deep into the water; light sub-strata.

Edge Reservoirs, containing together 1,411,747,289 gallons, and covering 407 acres with water, amounts to of the earthwork, puddle pitching, and weirs, but not of land. These reservoirs, although situated at a distance of 3,354 acres.

Items.	Contract No. 1. From Bombay to Tanna. (Messrs. Faviell and Fowler.)			Contract No. 2. Line from Chen- dance to Perseek Point. (Mr. J. Jackson.)			Contract No. 3. From Perseek Point to Callian. (Jam- setjee Dorabjee.)			Contract No. 4. Line from Callian to Wasindree. (Jam- setjee Dorabjee.)		
	£	s.	d.	£	s.	d.	Rs.	a.	p.	Rs.	a.	p.
Southern teak, in girders, joists, &c. per cubic foot	0	4	6	0	4	6	2	0	0	2	8	0
Ditto, 3-inch planking, per square foot	0	5	0	0	4	0	2	0	0	0	10	0
Khair, in blocks, joists, posts, &c. ditto	0	3	0	0	3	0	1	0	0	1	0	0
One pair of gates, with posts, set, complete, including the coats of paint, as per specification and drawing, for 15 feet roadway ..	20	0	0	20	0	0	150	0	0	130	0	0
One pair of gates, 20 feet roadway	50	0	0	40	0	0	275	0	0	200	0	0
Ditto ditto, 30	100	0	0	45	0	0	.....			.....
Wicket gate, set, complete	5	0	0	3	0	0	50	0	0	50	0	0
Metalling for road, 9 inches thick, per square yard	0	2	6	0	1	0	0	8	0	0	8	0
Clay puddle for bridges, per cubic yard	0	2	6	0	1	6	0	12	0	0	12	0
Ballast for permanent road, provided and spread, per ditto ..	0	1	2	0	1	9	0	10	0	0	10	0
Ditto ditto on siding and stations	0	2	3	.....			.....			.....
Laying single line of permanent way, including keys, per lineal yard..	.....			0	1	9	1	0	0	1	4	0
Ditto double	0	4	0	.....			.....			.....
Laying a single crossing, per ditto	0	5	0	0	5	0	2	4	0	2	4	0
Cost-iron girders, fixed, complete .. ..	.....			12	0	0	.....			.....
Laying one set of points, ditto	0	6	0	.....			2	0	0	2	0	0
Ditto ditto, each .. ..	.....			2	10	0	.....			.....
Laying a complete through crossing, per lineal yard	0	6	0	0	5	0	2	4	0	2	4	0
Keys, per 1000	10	0	0	8	0	0	.....			.....
Loading rails, chairs, pins, and other materials, including loading and unloading, per ton per mile	0	1	0	0	1	0	.....			.....
Loading sleepers, per 100 per mile	0	5	0	0	10	0	.....			.....
<i>Wages.</i>												
Wages for excavators, per day	0	1	4	0	0	8	0	4	0	0	3	0
Bricklayers, ditto	0	8	0	0	1	3	0	8	0	0	8	0

[illegible]

Office Rates of the Superintendent of Repairs' Department.

Principal Descriptions of Works executed by the Superintendent of Repairs' Department.	No. 1. Office Estimated Rate per 100 cubic feet.
	<i>Rs. a. p.</i>
Excavation for foundation or for drains, in earth	0 8 0
Ditto ditto ditto, in soft moorum	0 12 0
Ditto ditto ditto, in hardditto	2 0 0
Ditto ditto ditto, in soft rock	3 0 0
Ditto ditto ditto, in solid ditto	6 0 0
Filling in foundation with rubble masonry	10 0 0
Rubble masonry superstructure, under 10 feet high	11 0 0
Block in course, with rubble masonry backing, like Byculla and Mazagon railway bridges	35 0 0
Cut-stone facing, middle dressed, per 100 square feet	44 0 0
Brick arching, exclusive of centering	27 0 0
Ditto with mud centering	30 0 0
Plastering, chunam, per 100 square feet	4 8 0
Ditto polished, and on curvilinear surface	6 0 0
Coping stone, rough dressed, per cubic foot	0 10 0
Slab-stones for covering small drains, 2 feet by 1 foot, by 5 inches thick, each	0 5 0
Ditto ditto ditto, 3 feet by 1 foot, by 5 inches thick, each	0 8 0
Ditto ditto ditto, 4 feet by 1 foot, by 5 inches thick, each	0 12 0
Pavement Porcubunder stone on rubble masonry, 1 foot thick, per 100 square feet	30 0 0
Ditto blue stone, rough dressed, in rubble masonry foundation	1 8 0
Ditto ditto, middle dressed	2 3 0
Ditto chunam terrace floor	9 0 0
<i>Road-making.</i>	
Raising embankment up to the height of 5 feet from side cutting	0 10 4
Ditto ditto, to ditto within $\frac{1}{4}$ mile lead	0 15 0
Dry stone retaining wall	2 6 0
Raising and levelling ground for roadway of not more than a foot in mean height	1 0 0
Khandkies, hammer dressed, for kerbstone, 1 foot square, $1\frac{1}{2}$ feet long, per 100 khandkies	13 0 0
Rough stone kerbstone (undressed)	6 0 0
Paved side water-table for town roads, 1 foot wide, per 100 running feet.	20 0 0
Slabstone for sink, 2 by $1\frac{1}{2}$, perforated with 5 holes	1 8 0
Broken stone, for metalling $1\frac{1}{2}$ inches thick, per 100 square feet, laying and rolling included	0 12 6
Ditto ditto 2 inches ditto ditto ditto	1 0 9
Ditto ditto 3 ditto ditto ditto	1 9 0
Ditto ditto 4 ditto ditto ditto	2 1 3
Ditto ditto 6 ditto ditto ditto	3 2 0
Sand-stone, $\frac{1}{2}$ inch thick, laying and rolling, per 100 square feet	0 12 0
Ditto 1 inch thick, ditto ditto ditto	1 0 0

Rates of the Estimate, and of the lowest Tenders for the filling in of Mody Bay, on the Sea-face of the Fort of Bombay.

[The work consisted of a Sea-wall about 22 feet in height, and filling in behind; the total estimated cost being about £ 70,000.]

(GARRISON ENGINEER AND CIVIL ARCHITECT.)

Items.	Quantity.	Rate.	Per	Amount.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>
Excavation for foundation of sea-wall within, at, or nearly at low-water mark.....	163,532	2 0 0	100 cub. ft.	3,270 10 0
Rubble masonry in foundation of sea-wall	142,817	19 0 0	Do.	27,135 3 8
Khandkee facing in foundation of sea-wall	12,435	50 0 0	100 sq. ft.	6,217 8 0
Squared stone-cap of foundation of sea-wall	4,145	200 0 0	100 rg. ft.	8,290 0 0
Rubble masonry in sea-wall . . .	465,632	19 0 0	100 cub. ft.	88,470 12 3
Khandkee facing in sea-wall . . .	81,539	75 0 0	100 sq. ft.	61,154 4 0
Dove-tailed coping stone of the sea-wall	4,145	275 0 0	100 rg. ft.	11,398 12 0
Rubble masonry in walls at any spot within the sea-wall.....	74,974	16 0 0	100 cub. ft.	11,995 13 5
Brick masonry arch-work	9,761	30 0 0	Do.	2,928 4 9
Chunam plaster, $\frac{3}{4}$ inch thick.....	3,897	4 8 0	100 sq. ft.	152 0 0
Filling in of sand or earth.....	24,013,613	2 8 0	100 cub. ft.	6,00,340 5 2
Total.....	.....	.....	..... Rs.	8,21,354 7 3

(PEERKHAN LANDKHAN and SAYBOO NURSOO.)

Items.	Quantity.	Rate.	Per	Amount.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>
Excavation for foundation of sea-wall within, at, or nearly at low-water mark... ..	163,532	1 14 0	100 cub. ft.	3,066 3 7
Rubble masonry in foundation of sea-wall	142,817	17 0 0	Do.	24,278 14 2
Khandkee facing in foundation of sea-wall	12,435	48 0 0	100 sq. ft.	5,968 12 9
Squared stone-cap of foundation of sea-wall	4,145	175 0 0	100 rg. ft.	7,253 12 0
Rubble masonry in sea-wall . . .	465,632	17 0 0	100 cub. ft.	79,157 7 0
Khandkee facing in sea-wall	81,539	65 0 0	100 sq. ft.	53,000 0 0
Dove-tailed coping stone of the sea-wall	4,145	250 0 0	100 rg. ft.	10,362 8 0
Rubble masonry in walls at any spot within the sea-wall.....	74,974	15 0 0	100 cub. ft.	11,246 1 7
Brick masonry arch-work	9,761	28 0 0	Do.	2,733 1 3
Chunam plaster, $\frac{3}{4}$ inch thick.....	3,397	4 4 0	100 sq. ft.	144 5 11
Filling in of sand or earth.....	24,013,613	2 2 0	100 cub. ft.	5,10,289 4 5
Total.....	.....	.....	..... Rs.	7,07,500 0 0

(ELSETTE NURSOO and RAJUNNA CRUSTNAJEE.)

Items.	Quantity.	Rate.	Per	Amount.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>
Excavation for foundation of sea-wall within, at, or nearly at low-water mark	163,532	2 4 0	100 cub. ft.	3,679 7 6
Rubble masonry in foundation of sea-wall ..	142,817	15 0 0	Do.	21,422 8 9
Khandkee facing in foundation of sea-wall	12,435	45 8 0	100 sq. ft.	5,657 14 9
Squared stone-cap of foundation of sea-wall	4,145	180 0 0	100 rg. ft.	7,461 0 0
Rubble masonry in sea-wall	465,632	17 0 0	100 cub. ft.	79,157 7 0
Khandkee facing in sea-wall	81,539	70 0 0	100 sq. ft.	57,077 4 9
Dove-tailed coping stone of the sea-wall	4,145	260 0 0	100 rg. ft.	10,777 0 0
Rubble masonry in walls at any spot within the sea-wall.....	74,974	14 0 0	100 cub. ft.	10,496 5 9
Brick masonry arch-work'.....	9,761	32 0 0	Do.	3,123 8 3
Chunam plaster, $\frac{3}{4}$ inch thick ...	3,397	5 0 0	100 sq. ft.	169 13 7
Filling in of sand or earth.....	24,013,613	2 2 0	100 cub. ft.	5,10,289 4 5
Total.....	.....	.....	..... Rs.	7,09,311 10 9

(Signed) J. J. F. CRUIKSHANK, Captain,
Garrison Engineer, and Civil Architect, Presidency.

FINANCIAL DEPARTMENT (*Railway Branch*),
Garrison Engineer and Civil Architect's Office,
Bombay, 10th March 1854.

Rates at which Bungalows are constructed on Malabar Hill.

Foundation digging	Rs.	0	10	0	per 100 cub. ft.
Ditto filling in with material, and labour inclusive	11	0	0		„ „
Ditto ditto ditto, with stone close by ..	12	0	0		„ „
Ditto ditto ditto, if stone from a distance.	13	0	0		„ „
Off-set wall above foundation	13	0	0		„ „
Filling in with earth and stone	1	0	0		„ „
Wall, with material, including labour, for bungalow, with plaster in and out	18	0	0		„ „
Ditto ditto ditto, for offices ditto ..	15	0	0		„ „
Plastering outside of the veranda off-set wall	3	0	0		„ sq. ft.
Flooring with chunam rough terrace	10	0	0		„ „
Teakwood doors for bungalow	1	4	0	per square foot.	
Ditto windows ditto	1	12	0		„ „
Jungle-wood doors and windows	0	12	0		„ „
Roofing for bungalow, with teak trusses, jungle round rafters, and ceiling, complete	65	0	0	per 100 sq. ft.	
Ditto for veranda with posts, putties, sawn, jungle rafters and battens, tiled complete	35	0	0		„ „
Ditto for offices.	35	0	0		„ „

Rates at which the Byculla Club Chambers were constructed.

Excavation foundation of main wall	Rs.	1	0	0	per 100 cub. ft.
Filling in foundation with stone and lime	10	0	0		„ „
Plinth of masonry walls	10	0	0		„ „
Stone and lime masonry walls	15	0	0		„ „
Brick partition, exclusive of plaster	30	0	0		„ sq. ft.
Plank partition, deducting doors	0	5	0		„ „
Roof, teak, double tiled, matted round, teak rafters, cut teak battens, with teak plank ceiling and cornice ..	70	0	0		„ „
Ground floor, terraced	12	0	0		„ „
Teak plank floors, with aynee jungle joists	40	0	0		„ „
Teak rails for staircases and gallery	0	8	0	per running foot.	
Cornice to gallery	1	0	0		„ „
Cloth ceiling, including teak cornice	12	0	0	per 100 sq. ft.	
Plank ceiling	20	0	0		„ „
Masonry drain, covered, $1\frac{1}{2} \times 1\frac{1}{2}$	1	0	0	per running foot.	
Teak posts	2	8	0	per cubic foot.	
Chunam plaster, and green and white wash	5	4	0	per 100 sq. ft.	
Teak plank doors, $3 \times 6\frac{1}{2}$	15	0	0	each.	
Ditto windows, with teak bars, $3\frac{1}{2} \times 6$	21	0	0		„
Fixed venetians to galleries, 8×7	63	0	0		„

Teak venetianed doors, 8 × 8	..	..	..	Rs.	80	0	0	each.
Ditto ditto, 4 × 7	..	..	..	..	42	0	0	„
Teak pannelled doors, 2 × 6½	..	..	..	..	16	0	0	„
Teak venetianed doors, 3 × 7	..	..	..	..	30	0	0	„
Bathing-room and pannelled doors, 2½ × 6½	..	..	..	..	18	0	0	„
Teak trellis windows, 16½ × 3	..	..	..	..	24	0	0	„
Teak folding, venetianed windows, 4 × 7	..	..	..	..	42	0	0	„
Ditto ditto ditto, 4 × 6	..	..	..	..	36	0	0	„
Passage lattice-work	..	..	..	..	0	2	0	per foot.
Green wash to cloth ceiling	..	..	..	..	1	4	0	per 100 sq. ft
Green paint, two coatings, and varnished	..	..	..	..	6	0	0	„ „

APPENDIX C.

ON AQUEDUCTS, AND THE COST OF PUMPING BY
STEAM-POWER.

1. The ground between the reservoir at Vehar and the Native Town of Bombay is very unfavourable to the construction of a masonry aqueduct. The distance is $14\frac{1}{2}$ miles, and all the fall is in the first $4\frac{1}{2}$ miles, leaving $10\frac{1}{2}$ miles over which the channel must be raised by arching till a proper declivity be obtained; and in two places this channel would have to cross deep salt marshes.

2. Even were the ground favourable to the construction of an aqueduct, the constant charge of pumping the water from the reservoir into which the aqueduct would flow, up a stand-pipe, so as to obtain a sufficient head to command the town, would be so great as to leave no question regarding the superior economy of the gravitation system.

3. Wherever the utmost head of water available is insufficient to the working of the gravitation system, the first point to be considered is the declivity to be given to the aqueduct.

4. The Romans did not allow the declivity of an aqueduct to be less than a quarter of an inch per 100 feet; this is equivalent to a fall of $13\frac{1}{4}$ inches per mile. The Croton Aqueduct, the largest of modern times, has been constructed according to this rule; its ruling declivity being $13\frac{1}{4}$ inches per mile.

5. The minimum declivity admissible in an aqueduct is 8 inches a mile. This will give a current of about 14 inches a second, which velocity has been found indispensable, to prevent the fermentation and decomposition of the organic matter usually contained in water.

6. The curves which are used to change the directions of an aqueduct should be of as large radius as possible: the minimum radius used on the Croton Aqueduct is 500 feet.

7. The Water Supply of Bombay at the rate of 20 gallons per head per day would amount to 10,000,000 gallons daily, or 18.57 cubic feet per second; and with an inclination of 8 inches per mile, this quantity would require a channel, according to De Prony,* of 15.59 square feet.

** De Prony's Formula.*

Let Q, ϕ , and S represent the same quantities as above.

P = wet contour, in yards.

a = a constant quantity = 0.0000444.

According to a formula in Weale's Rudimentary Treatise on

Logarithms, require a channel of 15·472 square feet.

According to a formula in Aide-Mémoire (Vol. III. page 693),

require a channel of 15·89 „

According to a formula given by Tadini, require a channel of... 16·5 „

8. Were engine-power substituted for gravitation at Bombay, the aqueduct should discharge itself into a reservoir at Byculla formed out of the large quarry immediately

$b = \text{a constant quantity} = 0\cdot000309.$

$$\therefore \frac{S^3}{P} = \frac{1}{\Phi} \left(a Q S + b Q^2 \right) = 948\cdot41.$$

Assuming $P = 4$ } we obtain $S = 15\cdot59$ square feet.
and $S = 16$ }

Weale's Series, Rudimentary Treatise on Logarithms, page 53.

Let $Q =$ the quantity discharged in a second, in cubic feet $= 18\cdot57.$

$\Phi =$ inclination, 8 inches to a mile $= \frac{1}{7975}.$

$S =$ sectional area, in feet.

$P =$ wet contour, in feet.

$$\therefore S \sqrt{\frac{S}{P}} = \sqrt{\frac{Q^2 \times \frac{1}{\Phi}}{(91\cdot411)^2}} = 17\cdot866.$$

Assuming $S = 16$ feet, and $P = 12$ feet,

We obtain $S = 15\cdot472$ square feet sectional area. This corrected value is not substituted for $\sqrt{\frac{S}{P}}$, as the quotient does not materially differ.

Aide-Mémoire, Vol. III. page 693.

Let $Q =$ quantity discharged in a second, in cubic feet $= 18\cdot57.$

$\Phi =$ inclination, 8 inches to a mile $= \frac{1}{7975}.$

$S =$ sectional area, in feet.

$P =$ wet contour, in yards.

$$\therefore S \sqrt{\frac{S}{C}} = \sqrt{\frac{Q^2 \times \frac{1}{\Phi}}{2736}} = 31\cdot595.$$

Assuming the sectional area to be 16 feet, and wet contour 4 yards, we obtain $S = 15\cdot797$ feet.

Substituting $15\cdot797$ for $\sqrt{\frac{S}{C}}$ we get $S = 15\cdot89.$

Tadini's Formula.

Let $Q =$ quantity discharged in a second, in cubic feet $= 18\cdot57.$

$\Phi =$ inclination, 8 inches to a mile $= \frac{1}{7975}.$

$l =$ the mean width of the channel, in feet.

$h =$ the height of the channel, in feet.

$$lh \sqrt{h} = \frac{Q \sqrt{\frac{1}{\Phi}}}{50} = 33.$$

Assuming $h = 4$ feet, $lh = 16\frac{1}{2}$ feet $=$ sectional area of the channel.

From a formula in Weale's Series the sectional area is 15·472 square feet.

From a formula in Aide-Mémoire the sectional area is 15·89 „

By Tadini's formula the sectional area is 16·5 „

By De Prony's formula the sectional area is 15·59 „

west of the Byculla Tank, and from this it would be pumped by steam-power up a stand-pipe, in order to give it a sufficient head to afford high-service to the town.

9. The height of the stand-pipe should not be less than 100 feet, and up to this height the whole of the 10,000,000 gallons required for the daily supply of Bombay must be pumped by steam-engines.

10. To pump up this amount daily, two Cornish engines would be required, of about 110 horse-power each; and in case of an accident to either, a third must be provided: engine-power to the amount of 330 horse-power would be therefore required.

11. The working charges of two engines of 110 horse-power each, employed in pumping 10,000,000 gallons daily 100 feet high, would be in Cornwall about £9 8s. per diem. In Bombay the working charges are nearly three times as great as in England, but taking them only two and a half times as much, would make the cost of the engine-power required at Bombay per day £15 12s. 6d.; and this constant charge, at 5 per cent., is equivalent to an increase of Rs. 1,14,060 in the first cost of the works, and £5,703 per annum.

12. The first cost of the engine, reservoir, aqueduct, &c. would not materially differ from the first cost of the main conduit pipe required.

COST OF ENGINE-POWER.

13. Cost of engine-power, extracted from former Report:—

“One single pumping engine, made by Harvey & Co., upon the expansive principle, in 1837, working twenty-four hours per diem seven days per week, mean power 95½ horses, quantity of water raised per diem 4,107,816 gallons, 110 feet high, cost of coals 12s. per ton. In the estimate for the cost, all charges for coal, labour, and stores are included, but no charge for interest upon outlay, or repairs of machinery and buildings; all other charges for working the engine are included. The estimate made upon the average of four years’ working—

Cost of raising 1,000 gallons 100 feet high 0s. 0.150d.

Or, cost of raising 80,000 gallons 100 feet high 1s.”

The cost of coal, labour, and stores, may be taken at Bombay at about two and a half times the London rate.

In the mining districts of Cornwall, where much attention has for many years been paid to the economical arrangement of pumping engines, even higher results have been obtained. Many engines in that country have for months together kept up a “duty” of from 90 to 120,000,000 lbs. of water raised 1 foot high by the combustion of each single bushel of coal consumed. A bushel of coal equals 87¼ lbs., and there are therefore about 25¾ bushels in a ton. One gallon of water weighs 10 lbs. ½ oz., say 10 lbs. only. The work of the most improved Cornish engines may be therefore stated as follows:—When performing a duty of 90,000,000, they will lift 23,130,000 gallons of water 10 feet high; or 2,313,000 gallons 100 feet high, by the combustion of each ton of coal consumed; and when doing a duty of 120,000,000 they will lift 30,560,000 gallons of water 10 feet high, or 3,056,000 gallons 100 feet high, by the combustion of each ton of coal consumed.

Smaller sized engines will not work to the same advantage as larger ones. The following table is extracted from the evidence of Mr. Hocking (one of the principal

manufacturers of the Cornish pumping engine) in the last Parliamentary Report on the Water Supply of the Metropolis :—

Cost of Pumping Water for the Supply of Towns, by Cornish Engines of various sizes, using Newcastle Small Coals, at 12s. per Ton.

Size of Engine.	Quantity of Water raised 100 feet high for 1s.
Horse-power.	Gallons.
230	87,997
180	80,436
135	74,862
100	67,818
65	61,549
40	54,905
25	43,214

N. B.—This estimate does not include interest on outlay, or the repairs.

Engines of this description of the largest size would cost, when set to work, about £50 per horse-power, the smaller one somewhat more; and the motion of this engine is so slow that there is scarcely any wear and tear of machinery, and the allowance for annual depreciation would be comparatively inconsiderable.

Tenders for Pumping Engines received for the Liverpool Waterworks.

We will undertake to make and erect for your Liverpool Waterworks steam-engines and pumps on the most approved Cornish principles, for the respective sums of money herein stated, you finding the necessary foundations for receiving the same; that is two steam-engines, each capable of raising 1,000,000 gallons of water per diem to the height of 300 feet, with good and sufficient pumps, for the sum of £9,850.

One steam-engine, and pumps for it, capable of raising 2,000,000 gallons of water per diem to the height of 300 feet, for the sum of £8,470.

One steam-engine and pump, capable of raising 1,000,000 gallons of water per diem to the height of 75 feet, for the sum of £3,400.

The above are intended to be what are called “Beam Engines”; but if you think proper to apply direct acting engines (fitted up also on the Cornish principle), we can reduce the cost of each engine £350 for the smaller ones, and £150 for the larger ones.

(Signed) ROBERT DAGLISH, Junior.

P. S.—We include duplicate boilers in each engine, and rams.

I beg to say that our prices for such engines as you name will (near as I can roughly estimate) be as follows :—

For two engines, each to raise 1,000,000 gallons of water per diem to the height of 300 feet, about £4,000 each, or	... ..	£8,000
For one engine, to raise 2,000,000 gallons per diem 300 feet high	...	£7,000
For one engine, to raise 1,000,000 gallons per diem 75 feet high	...	£1,800

The above prices include every expense of erecting and setting to work, complete with necessary tools and duplicate parts; the clothing of the cylinder and steam-pipes, with felt, &c.; also all iron girders and plates required for the floors of engine houses; but do not include the stand-pipes, as I apprehend you will have on the spot large size pipes applicable to that purpose.

(Signed) For SANDYS, VIVIAN, & Co.,
SAMUEL HOCKING.

We beg to state that our price for supplying and putting up engine-power and pumping machinery on the Cornish principle will be as follows:—

Two engines, each to raise 1,000,000 gallons of water per diem to the height of 300 feet, £4,850 each; or say engine-power to raise 2,000,000 gallons per diem 300 feet, £9,700; and for engine-power to raise 1,000,000 gallons of water per diem to the height of 75 feet £3,200.

(Signed) GEO. FORRESTER & Co.
Pro A. BOWER.

Summary of preceding Tenders.

Contractors' Names.	Two Engines, each to raise 1,000,000 Gallons per Day 300 Feet.	One Engine, to raise 2,000,000 Gallons per Day 300 Feet.	One Engine, to raise 1,000,000 Gallons per Day 75 Feet.
	Cost.	Cost.	Cost.
Messrs. Daglish.. ..	£9,850	£8,470	£3,400
Sandys, Vivian, and Co. ..	8,000	7,000	1,800
Forrester and Co. . . .	9,700	9,700	3,200

APPENDIX D,

ON THE PROPORTIONS AND COST OF PIPES.

LIVERPOOL CORPORATION WATERWORKS.

Determination of the Average Cost per Yard of the Pipes to be laid from Rivington to Old Swan, near Liverpool.

	No. of Pipes.	Length. Yards.	Mean Weight of Pipe. Cwt. qrs. lbs.	Total Weight. Tons. cwt. qrs. lbs.		Price per Ton. £ s. d.	Cost. £ s. d.	Cost of each Contract. £ s. d.	Average Price per Yard, delivered at Liverpool. £ s. d.
1	2,500	10,000	51 3 9	6,478 15 3	16	4 15 0	30,774 5 6		
1 1/4	2,000	8,000	55 0 16	3,514 5 2	24	4 15 0	26,192 7 1		
1 1/2	575	2,300	58 1 24	1,680 16 3	24	4 15 0	7,984 0 7		
1 3/4	1,191	4,764	61 3 5	3,679 17 1	19	4 12 6	17,019 8 1		
1 1/2	316	1,264	65 0 15	1,029 2 1	8	4 12 6	4,759 13 3		
1 1/4	363	1,452	68 2 0	1,243 5 2	0	4 8 0	5,470 8 2		
1 1/2	462	1,848	71 3 12	1,659 18 0	0	4 7 6	7,262 1 3		
1 3/4	759	3,036	75 0 25	2,854 14 1	19	4 7 6	12,489 8 1		
1 1/2	627	2,508	78 2 11	2,464 1 0	9	4 6 8	10,677 11 4		
1 3/4	190	760	81 3 26	778 16 2	12	4 6 8	3,374 18 8		
1 1/2	245	980	85 1 14	1,045 16 3	14	4 6 8	4,531 19 10		
	9,495	36,912						25,221 17 6	3 10 8 1/2
								18,584 9 10	
								£130,536 11 10	

NOTE.—The pipe from Old Swan to Kensington is of only 36 inches diameter, instead of 44 inches, and therefore of less cost, reducing the average below the amount above stated.

CONTRACTS FOR 44-INCH PIPES.

The London and Vulcan Iron Company.

Thickness of Metal in the Barrel.	Number of Pipes re-quired.	Mean Weight of each Pipe.	Extent of Deviation.			Proof Pres-sure in Ver-tical Altitude of Water.	Price per Ton.
			From		To		
		Cwt. qrs. lbs.	Cwt. qrs. lbs.	Cwt. qrs. lbs.			
1 $\frac{7}{8}$ "	200	75 0 25	73 2 8	76 3 22	500	} £4 6s. 8d.	
1 $\frac{1}{2}$ "	680	78 2 11	76 3 22	80 1 9	500		
1 $\frac{9}{16}$ "	200	81 3 26	80 1 9	83 2 25	600		
1 $\frac{5}{8}$ "	200	85 1 14	83 2 25	87 0 3	600		

Branches, bends, flanch-pipes, and other special castings, at £6 10s.

Messrs. NEILSON and Co.

1 $\frac{5}{8}$ "	380	68 2 0	66 3 11	70 0 23	400	} £4 8s.
1 $\frac{1}{2}$ "	470	71 3 12	70 0 23	73 2 8	500	
1 $\frac{7}{8}$ "	570	75 0 25	73 2 8	76 3 22	500	

Branches, bends, flanch-pipes, and other special pipe-castings, at £1 18s. per ton extra.

Messrs. GOLDIE and Co.

1 $\frac{1}{2}$ "	1,000	58 1 24	56 3 7	60 0 16	300	} £1 15s.
1 $\frac{7}{8}$ "	1,200	61 3 5	60 0 16	63 1 26	400	
1 $\frac{1}{4}$ "	270	65 0 15	63 1 26	66 3 11	400	

SUMMARY.

Contractors.	No. of Pipes.	Tons Weight.	Price.	Amount.
			£ s. d.	£ s. d.
London Vulcan Iron Company	1,280	5,098	4 6 8	22,091 6 8
D. Y. Stewart & Co.	4,500	11,993	4 15 0	56,996 15 0
Goldie & Co.	1,000	2,923	4 15 0	13,884 5 0
Ditto	1,470	4,587	4 12 6	21,214 17 6
Neilson & Co.	380	1,302	4 8 0	5,728 16 0
Ditto	1,040	3,833	4 7 6	16,769 7 6
Total...	.....	.....	... £	136,685 7 8

Exclusive of special castings, referred to in the several contracts.

Particulars of the progress of the 44-inch Pipe Contracts for the Corporation of Liverpool, as returned by Mr. ABSALOM FRANCIS, Jr., Pipe Inspector, showing the Time they took in making.

Date.	By whom manufactured.	Total No.	Length when laid.	Weight.	Amount.	Remarks.
			Yards.	Tons. cwt. qrs.	£ s. d.	
1850						
Up to Feb. 28th	Messrs. D. Y. Stewart and Co. . .	1,406	5,624	3,781 9 3	18,007 9 9	Delivered at Horwick.
"	Messrs. J. Goldie and Co.	782	3,128	2,484 12 0	11,369 14 11	Ditto at Birkenhead.
"	Messrs. Wilson and Co.	536	2,144	2,203 17 3	9,530 3 10	Ditto ditto.
"	Messrs. Neilson and Co.	100	400	360 0 0	1,575 0 0	Not yet delivered.
From Feb. 28th	Messrs. D. Y. Stewart and Co. . .	2,824	11,296	8,779 19 2	41,402 8 6	A small portion delivered, and a portion now in stock.
to March 31st	Messrs. J. Goldie and Co.	300	1,200	850 0 0	4,250 0 0	
	Messrs. Wilson and Co.	156	624	490 0 0	2,278 0 0	
	Messrs. Neilson and Co.	98	392	368 0 0	1,672 0 0	
		35	140	126 0 0	553 0 0	
Total to March 31st	By all of the Contractors	589	2,356	1,834 0 0	8,753 0 0	At the present rate of casting.
		3,413	13,652	10,613 19 2	50,155 8 6	

3,413 pipes, of 12 feet each, = 7 $\frac{1}{2}$ miles in length, or nearly one-third of the whole.

At the present rate of casting,

Messrs. D. Y. Stewart and Co. will finish their contract in 8 months.
 Messrs. J. Goldie and Co. ditto ditto 10 "
 Messrs. Wilson and Co. ditto ditto 8 "
 Messrs. Neilson and Co. ditto ditto 12 "

Mr. NEWLAND'S *Schedule of Cost of Mains.*

10-inch main	15s. per yard.
12-inch ditto	20s. „
15-inch ditto	25s. „
18-inch ditto	30s. „
Cost of laying 44-inch main alone. .	40s. „

Schedule of Sizes of Pipes, given by Mr. DUNCANSON.

Diameter of Pipes.	Number of Belts.	Thickness of Metal.	Mean Weight of each Pipe.	Permitted Deviation from prescribed Weight.	Length of each Pipe in Work.	Price per Pipe cast from the Cupola, or Air Furnace.
		Inches.	Cwt. qrs. lbs.	lbs.	Feet.	£ s. d.
2 inches. . .	2 belts. {	$1\frac{5}{8}$	0 1 24	2	6	0 2 4 $\frac{1}{2}$
2 $\frac{1}{2}$ do. . .		$1\frac{3}{4}$	0 2 10	2 $\frac{1}{2}$	6	0 2 11
3 do. . .	3 belts. {	$1\frac{1}{2}$	1 0 3	3	9	0 5 3
4 do. . .		$1\frac{3}{8}$	1 1 24	4	9	0 6 10
5 do. . .		$1\frac{1}{2}$	1 3 24	5	9	0 9 5
6 do. . .		$1\frac{3}{4}$	2 2 2	6	9	0 12 1
7 do. . .	1 belt under-socket. {	$1\frac{1}{2}$	3 0 14	7	9	0 15 0
8 do. . .		$1\frac{1}{2}$	3 3 5	8	9	0 18 3
9 do. . .		$1\frac{1}{2}$	4 2 2	9	9	1 1 7
10 do. . .		$1\frac{1}{2}$	5 1 6	10	9	1 5 5
11 do. . .		$1\frac{1}{2}$	6 0 16	11	9	1 9 6
12 do. . .		$1\frac{1}{2}$	7 0 5	12	9	1 13 9

Branches, bend taper pipes, fire-plug pipes, cock and plug castings, and other similar hollow castings, not exceeding 6 inches internal diameter, and made from the cupola or air furnace 7s. 9d. per cwt.
Ditto ditto, exceeding 6 inches diameter, and not exceeding 12 inches diameter, and made from the cupola or air furnace . . 7s. 3d. „
Boring fire-plug branches. 1s. each.

Cost of laying 24-inch Main.

Opening and filling up trench, 3 feet 4 inches, or 5 feet . .	1s. 8d. per yard.
● Casting rubbish	1s. „
Ditto pipes (one mile)	8d. „
Lead	2s. 6d. „
Junk	6d. „
Coals	2d. „
Paring	8d. „
Contingencies	4d. „
Total. .	7s. 6d. „

DIMENSIONS AND WEIGHTS OF CAST-IRON AND LEAD PIPES.

The following table gives the usual dimensions of cast-iron pipes, with their weights, up to 15 inches diameter :—

Internal Dia- meter of Pipe.	No. of Belts per Pipe.	Length over Joints.	Net Length in in Work.	Weight per Pipe.	Thickness of Barrel.
Inches.		Feet. Inches.	Feet. Inches.	Cwt. qrs. lbs.	Inches.
1½	...	4 9	4 6	0 1 0	0·288
2	6 4	6 0	0 1 21	0·3
2½	...	6 4	6 0	0 2 5	0·313
3	Two belts.	9 4	9 0	0 3 24	0·325
4		...	...	1 1 12	0·35
5		...	...	1 3 6	0·375
6		9 6	...	2 1 4	0·4
7		....	....	2 3 8	0·425
8	3 1 15	0·45
9	4 0 2	0·475
10	4 2 21	0·5
11	5 0 17	0·525
12	6 1 0	0·55
13	6 3 14	0·575
14	9 8	....	7 2 20	0·593
15	8 1 13	0·612

The dimensions of lead pipes may be calculated by the formula $x = \frac{p r}{c - r}$.

Mr. Jardine, of Edinburgh, found that a pipe 1½ inch in diameter and ¼ inch thick resisted a head of 1,000 feet, but that it burst with a head of 1,200. Another lead pipe 2 inches in diameter, and also ¼ inch thick, resisted a head of 860 feet, but burst with a head of 1,000 feet. The usual thickness of lead pipes in commerce is about ¼ inch, and the weights per foot run are as follows :—

Thickness....	1-in.	1½-in.	1¾-in.	1⅞-in.	1⅞-in.	1⅞-in.	1¾-in.	2-in.
Weight	4·85	5·34	5·81	6·3	6·79	7·27	7·76	8·73

Belidor states that a large lead pipe 13 inches in diameter and ⅜ inch thick will resist a pressure of 3 atmospheres. The pipes in the gardens of Versailles are 2 feet and 1½ inch in diameter, and 1⅜ inch thick.

APPENDIX E.

Memorandum of Heights above the Sea of different inhabited points on the Island of Bombay, according to the Sections of Work of Drainage on the Records of the Office of the Superintendent of Repairs.

Streets.	Measurement in Feet and Inches of different places above Low-water Mark.		Particulars.
	Feet	Ins.	
ARDASEER DADDY STREET, part of GIP- gaum B. L. to Bhoolesh- wur Row. SHAIK MEMON STREET. OLD and NEW WITTUL WADY, PARELL ROAD, and HUNNUMAN LINE STREET.	8	5	Surface of Koombarwada Row, over Waddington Bridge. (Before the commencement of the arch-work of Main Town Drain.)
	8	8	Ditto of Ardaseer Daddy Street, at Khatewady New Road. (Ditto.)
	11	0	Ditto of Bhooleshwur Road, at Cowasjee Patel's Tank Road.
	16	10	Ditto ditto, in the middle of Cowasjee Patel's Tank.
	13	10	Ditto ditto, at Portuguese Church Street.
	14	7	Ditto ditto, at Parell Road, or Moombadavce Chowkee.
	16	2	Ditto of Shaik Memon Street, at Musjeed Bunder Cross-road.
	16	5	Ditto ditto, at Agiary Lane, near well.
	15	6	Ditto ditto, at Mirza Oil-maker Street.
	15	10	Ditto ditto, at Gunnesh Wady Lane.
	16	3	Ditto ditto, at Shaik Ally Jungurkur Street.
	16	10	Ditto ditto, at Esplanade Cross-road and New [Line Street.
	17	5	Ditto of Parell Road, at Agiary Lane.
	18	4	Ditto ditto, at Wittul Wady Street.
	19	8	Ditto ditto, at Kavel Street.
	21	5	Ditto ditto, at Colbhat Row.
	22	1	Ditto ditto, at Colbhat Wady 3rd Lane.
	22	3	Ditto ditto, at New Line Street.
	21	5	Ditto ditto, at Jambool Wady Lane.
	21	1	Ditto ditto, at Esplanade Cross-road.
	11	3	Ditto ditto, at Jugjeevun Keka Street.
	11	3	Ditto ditto, at Poydownee Cistern.
	18	6	Ditto of Wittul Wady Street, at Tellowady, towards Parell Road.
	17	10	Ditto ditto, at Shaik Memon Street.
	20	4	Ditto of Old Hunnuman Lane, at the distance of 235 feet from Parell towards Shaik Memon Street.
	18	1	Ditto ditto, ditto, 600 feet ditto ditto.
	16	7	Ditto ditto, at the junction of New Hunnuman Lane.
	23	9	Ditto of New Hunnuman Lane, at the distance of 225 feet from Parell road, towards Shaik Memon Street.
	20	7	Ditto ditto, ditto, 700 feet ditto ditto.

Streets.	Measurement in Feet and inches of different places above Low-water Mark.		Particulars.
	Feet	Ins.	
ESPLANADE NEW LINE CROSS-ROAD. STREET.	19	11	Surface of New Line Street, at water-well.
	21	6	Ditto ditto, at unmade Street leading to New Hunnuman Lane.
	18	5	Ditto of New Sonapoor Street, at Breachcandy Road.
	17	11	Ditto ditto, at Trinity Chapel Street.
	14	7	Ditto ditto, at Pork Market Well.
	21	3	Ditto of Esplanade Cross-road, at Picquet Road.
	20	4	Ditto ditto, at Cross-lane leading to Well in New Line Street.
	20	5	Ditto ditto, at Breachcandy Road.
	21	9	Ditto of Picquet Road, in middle.
	19	9	Ditto of Breachcandy Road, at Marine 1st Lane.
	20	5	Ditto ditto, at Esplanade Cross-road.
	19	5	Ditto ditto, at Jambool Wady Lane.
BREACHCANDY ROAD.	16	5	Ditto ditto, at Chundun Wady Lane.
	16	10	Ditto ditto, at Colbhat Road.
	16	10	Ditto ditto, at Old Sonapoor Street.
	16	4	Ditto ditto, at Agiary Lane.
	16	10	Ditto ditto, at Burrows Lane.
	16	11	Ditto ditto, at Thackoordwar Lane.
	17	9	Ditto ditto, at Moogbhut Lane.
	17	0	Ditto ditto, at Canda Wady Lane.
	20	1	Ditto ditto, at the distance of 565 feet from Canda Wady Lane, towards Portuguese Church.
	15	8	Ditto ditto, at Churney Road, near Portuguese Church.
	14	1	Ditto of Chundun Wady Lane, at unmade passage at the distance of 655 feet from Breachcandy Road.
	15	7	Ditto of Old Sonapoor Street, at the distance of 490 feet from Breachcandy Road.
SYUD ABDOOL RAHIMON STREET.	22	0	Ditto of Agiary Lane, at the distance of 490 feet from Breachcandy Road, towards Parell Road.
	19	11	Ditto ditto, at Portuguese Church Street.
	16	8	Ditto of Syud Abdool Rahimon Street, at Esplanade Cross-road.
	16	7	Ditto ditto, at Pinjaree Street.
	15	6	Ditto ditto, at Shaik Ally Jungurkur Street.
	15	4	Ditto ditto, at Gunnessh Wady Lane.
	14	7	Ditto ditto, at Balajee Shansett Street.
	14	7	Ditto ditto, at Bhajee Palla Road.
	13	11	Ditto ditto, at Meerza Oil-maker Street.
	14	3	Ditto ditto, at Nagdew Row.
	14	2	Ditto ditto, at Beebee Jan Row.
	14	3	Ditto ditto, at Musjeed Bunder Cross-road.
ESPLANADE CROSS-ROAD.	16	8	Ditto of Esplanade Cross-road, at Baloo Sarung Street.
	18	9	Ditto ditto, at Butcher Street.
	20	8	Ditto ditto, at Hussun Khan Khalifa Row.

Streets.		Measurement in Feet and Inches of different places above Low-water Mark.	Particulars.	
		Feet Ins		
DONGREE ESPLANADE COOLEE CROSS-ROAD. STREET.		20 7	Surface of Esplanade Cross-road,	at Old Caze Street.
		20 8	Ditto ditto,	at Bengal Poora Street.
		21 0	Ditto ditto,	at Old Jamlee Street.
		17 7	Ditto ditto,	at Dongree Coolee Street.
		18 7	Ditto of Dongree Coolee Street,	at Shaik Ally Jungurkur Street.
		17 3	Ditto ditto,	at Bunder Wada Street.
		20 11	Ditto ditto,	at Musjeed Bunder Row.
		21 6	Ditto ditto,	at Musjeed Bunder Cross-road.
		23 10	Ditto of Musjeed Bunder Cross-road,	at Caze Syed Street.
		27 6	Ditto ditto,	at Bhundaree Street.
		30 2	Ditto ditto,	at the distance of 100 feet from Bhundaree Street towards Syud Abdool Rahimon Street.
MUSJEED BUNDER CROSS-ROAD.		27 4	Ditto ditto,	at Mahar Wada.
		20 0	Ditto ditto,	at Dongree Jao Souza Row.
		17 11	Ditto ditto,	at 2nd Coombar Wada Street.
		15 10	Ditto ditto,	at 1st ditto ditto.
		13 6	Ditto ditto,	at Memon Wada.
		13 4	Ditto ditto,	at Butcher Nagdew Street.
		13 2	Ditto ditto,	at Narron Dhooroo Street.
		15 6	Ditto of Balloo Surang Street,	at Shaik Ally Jungurkur Street
		14 1	Ditto ditto,	at Bhajee Palla Road.
		15 2	Ditto of Butcher or Nagdew Street,	at Shaik Ally Jungurkur Street.
		14 2	Ditto ditto,	at Bhajee Palla Road.
		14 6	Ditto ditto,	at Nagdew Row.
		14 2	Ditto ditto,	at Beebee Jan Row.
		16 6	Ditto of Hussun Khan Khalifa Row,	at Shaik Ally Jungurkur Street.
		16 1	Ditto of Memon Wada,	at Shaik Ally Jungurkur Street.
		15 9	Ditto ditto,	at Bhajee Palla Road.
		15 4	Ditto ditto,	ditto.
		14 9	Ditto ditto,	at Nagdew Row.
		14 4	Ditto ditto,	at Beebee Jan Row.
		18 2	Ditto of 1st Coombarwada Street,	at Bhajee Palla Road.
		18 0	Ditto of Old Caze Street, and 2nd Coombarwada Street,	at Shaik Ally Jungurkur Street.
		18 6	Ditto ditto,	at Bhunder Wada Row.
		19 4	Ditto ditto,	at Bhajee Palla Road.
		22 5	Ditto ditto,	at the distance of 350 feet from Bhajee Palla Road, towards Musjeed Bunder Cross-road.
		18 1	Ditto ditto,	at Musjeed Bunder Cross-Road.
		20 9	Ditto of Bengal Poora Street,	at Shaik Ally Jungurkur Street.
		25 5	Ditto of Bhundaree Street,	at Essajee Hassajee Street.
		25 3	Ditto of Musjeed Bunder Row.	

Streets.	Measurement in Feet and Inches of different places above Low-water Mark.		Particulars.
MUSJEED BUNDER CROSS-ROAD.	Feet	Ins.	Surface of Old Jamlee Street, and Cazee Syed Street, at Shaik Ally Jungunkur Street. Ditto ditto, at Bhunder Wada Row. Ditto ditto, at Musjeed Bunder Row. Ditto of Nagdew Row, at Narron Dhooroo Street.
	23	6	
	22	0	
	21	1	
	13	7	

MAJOR CRAWFORD'S OBSERVATIONS ON MR. CONY-BEARE'S SECOND REPORT ON THE SUPPLY OF WATER TO BOMBAY.

To W. HART, Esq.,

Secretary to Government.

SIR,

I have the honour to acknowledge the receipt of Government Resolution No. 1235, of the 24th ultimo, referring Mr. Conybeare's Report, dated 13th March 1855, on the Water Supply for Bombay, for my early consideration.

2. It is hardly necessary for me to point out that the whole scheme has, in the course of further examination, become vastly extended beyond the original object. As first designed, it was intended principally to meet a temporary, though annually recurring scarcity ; it has now been enlarged, until, in its present proportions, it is sought to place the town and island of Bombay, with respect to its Water Supply, on a footing equal, if not superior, to many English towns, and that irrespective of the supply already existing on the island.

3. Extended, however, as it is in design, the project is radically the same as that first proposed. It is, therefore, needless to enter into any discussion of the general principles of the plan. It is still intended to store water in the large natural basin at Vihar, by throwing a dam across the valley, and certain low points of the surrounding hills ; to bring that water, by a large iron main, a distance of from 14 to 15 miles, to the centre of the town, and to distribute it thence by street branches, as marked in the plan exhibiting the distribution, a reduced main being continued on through the Fort, and to the end of Colaba.

4. The cost of this extended project, exclusive of all charges on account of land, is estimated at £245,916, a sum which, considering the large population to be supplied, and the vast benefits to be afforded, can by no means be considered an extravagant one. A question has however been raised, whether, considering the circumstances of the population, and the extent of the existing supply, it would not be better to carry out the plan, in the first instance, on a lesser scale than now suggested ; keeping the original object principally in view, but yet placing the work in such a state as to admit of the further development of the project as the demands for water increased.

5. In considering this subject, the project may be divided into three portions :—

1st.—The works required for storing the water at the Vehar Basin

2nd.—The main pipe, which is to convey it to the town.

3rd.—The minor street distribution.

6. Regarding the works for storing the water, it will be observed that the extended project will require at least three dams.

7. On the original plan, this would not have been necessary. The valley might have been closed by a single dam, 50 feet in height, at the point first proposed at Puspolee. But in Government letter dated 26th April 1851, the suggestion was even then made of increasing the height of this work, if only by an extra 10 feet. The full and detailed surveys now before Government show that any increase, even of 10 feet, above the height originally proposed, necessitates the construction of other smaller dams at certain low points in the surrounding hills.

8. Paragraph 64 of Mr. Conybeare's Report exhibits, in three tables, the full details of cost and quantities of three schemes, by any of which the capacity of the reservoir, as originally proposed, will be greatly increased.

9. The first two, however, are really one project. The main dam in both is placed at the site originally chosen at Puspolee, and the two tables exhibit the difference of cost that would be entailed between carrying it to a height of 84 feet or 88 feet. The two projects are estimated respectively at £35,700 and £43,445. Rejecting, therefore, this last, as offering no sufficient advantages for its increased cost and risk, the choice lies between the first and a dam of 78 feet in height, which Mr. Conybeare proposes to place at a point somewhat higher up the stream, and close to the village of Syee.

10. By the adoption of this latter, some valuable storage ground will, as mentioned in paragraph 17 of the Report, doubtless be lost; but as the reservoir will still be most ample for every purpose, I concur with Mr. Conybeare in his views on this point. By thus slightly changing the position of the dam, the more costly one across the Marole Valley will be avoided; and as the construction of this latter would have involved interference with another property, it is advisable to omit it if possible.

11. I would beg, therefore, to recommend that the reservoir be formed by a dam situated, as now proposed, a little above the original site, and estimated to cost, together with its two auxiliary ones, £17,411. The details of these dams are given in the third table, paragraph 64.

12. I must here observe, that, whatever views may be entertained of economising the works, by carrying them out in the first instance on a reduced scale, it is not in this sub-division that any attempt of the sort should be made. Not only does the cost of the works of the reservoir

bear but a small proportion to the entire cost of the whole project, but it is most essential that they, at any rate, should be carried out from the first in the most complete fashion, leaving nothing to be done to them hereafter.

13. The next item, that appears as No. 2 on the estimate (paragraph 134), connected with the works at the reservoir, is a catch-water drain, estimated at £5,000. This is referred to in paragraph 32 of the Report. It is designed to bring the surface drainage of an adjoining range of hills into the reservoir; but as it is a work that can be executed at any moment, it might for the present be excluded from the estimate, for I do not consider that it would be advisable to incur the expense until the necessity for it was felt, and this could not be until the whole works were complete, and the sufficiency or otherwise of the supply to be derived from the ground lying within the present water-shed line tested by experience. It is, however, satisfactory to know that the means exist for considerably extending, at a trifling cost, the available surface of the gathering-grounds.

14. The third item is "filters." From paragraphs 89 to 97, Mr. Conybeare details the various plans for filtration that might be adopted. It seems needless to review these, for not only are they costly, but all involve, in their application, a considerable loss of head of water. Considering that, as the reservoir will be supplied from the surface drainage of hills unoccupied by human dwellings, and that, from its depth, the water in it will be preserved in a state of great comparative purity, I think every requirement as regards filtration will be met by the plan proposed, of building at the foot of the inner slope of the dam a filtering tower of the porous sandstone of the country, and taking off the main pipe direct from the interior of this. By this means, the whole available head of water in the reservoir will be preserved—a most important consideration; whilst, at the same time, the water brought into the island will, I believe, equal in quality and purity that of the best of the existing wells.

15. These three items amount to £26,713, or, omitting No. 2, the catch-water drain, for the present, to £21,713.

16. The data upon which the cost of these works is estimated appear ample, and I see no reason to doubt but that the sums named will be fully sufficient.

17. The second sub-division of the works includes the main pipe, by which it is proposed to convey the water from the reservoir to the centre of the Native Town. This is entered in the estimate, item No. 4, at a cost, including laying, of £159,320.

18. The main originally proposed was one of 24 inches; that now suggested is of 41 inches diameter. It is in this, and the third sub-

division of the works, that a saving, if any, is to be made. At the rates assumed in Mr. Conybeare's estimate, the saving in cost of main pipe alone, by employing that of 24 inches, would be £73,000, and as, with the reduced main, it would be useless to attempt to carry out the street distribution on the scale now suggested, the saving on this portion would also be considerable. Taking the two together, the total saving would not probably be less than £100,000. The question is, whether, with a view to effect such saving, it is worth while to curtail this portion of the works at present, making arrangements, however, so that a second main may be laid down hereafter, when required.

19. I cannot but feel the great responsibility that attaches to offering an opinion on the subject. On the one hand, it may be urged in favour of the smaller scheme, that, with the exception of a short period during the hot months immediately preceding the monsoon, Bombay is well supplied with water; that the scarcity experienced during that period, trying though it certainly is, has hitherto been got over; that the water scheme, carried out on the smaller plan, would be sufficient to remove all anxiety on such account in future; and that the immediate saving of capital, and consequently of water-rate, in whatever shape levied, would be considerable.

20. On the other hand, it will be said that it is bad economy thus to establish considerable works, but only to the extent required to supply a comparatively trifling want, when, by a moderate extension of the project, such a supply of water could be thrown into the town as would serve not only for private but for commercial purposes, and thereby at once yield a considerable revenue.

21. It may be assumed as a certainty, that on the smaller scheme, little or no income would be derived from the sale of water; for the supply, over and above the public wants, would not be sufficiently abundant to allow of private supply to individuals being insured throughout the year. The total cost of the works and maintenance would thus remain a dead charge on the Municipal Funds.

22. The extended scheme, on the contrary, would afford such a large supply, that, provided the taste and habits of the Native inhabitants would admit of their having it laid on to their dwellings, a large revenue from the sale of the water might be looked for. Although some time might elapse before the people generally appreciated the benefit to be derived therefrom, there are many establishments that would, it may be presumed, avail themselves of it from the first—thus, the Jarnsetjee Hospital and Grant Medical College, the Byenlla Club, Parell House, the Railway Stations, the Barracks in Fort George, the Castle, European Merchants' houses in the Fort, the Mint, Dockyard, Hydraulic Cotton Press, Steam Press at Colaba, Barracks at Colaba. It might be safely

assumed, that all these would from the very first have water laid on to their premises ; all private European houses beyond the limits of the Fort and Town, to which the water could be brought, would most assuredly use it, in preference to the present method of having their daily supply brought by the bullock-load ; and I am inclined to think, that when it is perceived that the head of water admits of its being applied in the form of fountains, it would soon take the fancy of the Native gentry, for the adornment of their grounds and houses.

23. From all these sources, a considerable revenue would no doubt be derived ; but how long it would be before the revenue raised would be adequate to the increased capital required to put the works on the proposed extended footing, must remain to some extent a matter of conjecture.

24. I must admit that, at first, I was so doubtful on this point, and fearful that, by commencing the works on the extended plan, an immense supply of water would be thrown into the island, for which, for a long period, full use would not be found, that I inclined to think the smaller scheme the most advisable in the first instance ; but further consideration leads me now to the contrary opinion, and in the belief that it will be found in this, as in analogous cases, that the very facility of the supply will increase the demand and consumption, I would venture to recommend, that the largest main which the funds at the disposal of the municipality will afford should be provided.

25. I have considered this subject only with reference to its cost, and the possible return ; but I need hardly allude to the great facilities that will be afforded for extinguishing fires by the extended scheme. If the street distribution is carried out to anything like the extent proposed, the supply of a sufficiency of hose would go far to supersede the use of the ordinary fire-engine.

26. The last item is that of the minor street distribution. On this, little need be observed at present, further than that, as proposed, it is most ample. It is the 5th item of the estimate, paragraph 134, and amounts to £48,173. It depends, however, as already observed, upon the scale upon which the main pipe is laid down, to what extent this town and street distribution shall be carried ; for, if the diameter of the main is decreased, the extent of the town distribution must be so in like proportion.

27. With reference to paragraph 6 of the letter No. 19, from the Worshipful Bench of H. M.'s Justices, it is impossible, in a work like that now under consideration, of which the principal expense depends, in a great measure, upon the cost of an article the price of which is constantly fluctuating, to estimate the ultimate expenditure with precision. Mr. Conybeare has taken £8 as the price at which, according to

present rates, the pipe could be placed at Bombay. I have been given to understand that this may be considered low ; consequently, if that price is exceeded to any extent, the total cost of the project will, in all probability, exceed the sum named, Rs. 25,00,000. In the mean time, however, there does not appear to be any difficulty in meeting the wishes of the Bench, as expressed in paragraph 9 of their letter ; and I would recommend that Mr. Conybeare be authorised to procure and send out, as soon as possible, all the necessary pipe-valves and other fittings that will be required for the works at the reservoir ; for I see no reason why, if these are provided without delay, the work of damming the valley might not be proceeded with next season, so as to test the works of the reservoir by the monsoon of 1856.

28. The pipe thus to be provided, to be built in with the reservoir works, should of course be of the full size of 41 inches diameter.

I have the honour to be, &c.

J. H. G. CRAWFORD, Major,
Engineers.

April 20th, 1855.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. XXVII.—NEW SERIES.

MEMORANDUM

ON

MUNICIPAL CONSERVANCY

IN THE

**DISTRICTS OF THE BOMBAY PRESIDENCY, SIND,
AND SATTARA.**

BY

E. PRATT,

ASSISTANT SECRETARY TO GOVERNMENT, GENERAL DEPARTMENT.

B o m b a y :

**PRINTED AT THE
BOMBAY EDUCATION SOCIETY'S PRESS.**

1856.

PREFATORY MEMORANDUM.

THE Secretary in the General Department has the honour of submitting to the Honorable Board a Memorandum, drawn up by Mr. E. Pratt, Uncovenanted Assistant Secretary, which appears valuable, as containing a history of the proceedings which led to the enactment of Act XXVI. of 1850, and exhibiting the present state and prospects of the Municipal Conservancy System, as obtaining in the Districts of the Bombay Presidency, Sind, and Sattara.

The Secretary would suggest that this Memorandum and its Appendices should be printed as a number of the Government Selections, and that a sufficient number of copies should be sent to Mr. LeGeyt, and the other Members of the Legislative Council of India, for consideration, when disposing of the question as to what change of Law is desirable to encourage the measure of Municipal Conservation in the towns of the Mofussil.

W. HART,
Secretary to Government.

29th February 1856.

MEMORANDUM

CONTAINING A

SKETCH OF THE PROCEEDINGS WHICH LED

TO THE

ENACTMENT OF ACT XXVI. OF 1850;

AND EXHIBITING THE

PRESENT STATE AND PROSPECTS OF THE
MUNICIPAL CONSERVANCY SYSTEM,

AS OBTAINING IN THE

Districts of the Bombay Presidency, Sind, and Sattara.

BY

MR. E. PRATT,

UNCOVENANTED ASSISTANT SECRETARY TO GOVERNMENT, GENERAL
DEPARTMENT.

MUNICIPAL CONSERVANCY SYSTEM OF WESTERN INDIA.

IN a letter dated the 30th May 1836, Sir W. H. Macnaghten, then Secretary to the Government of India, addressed the Bombay Government as follows :—

“The attention of the Supreme Government has recently been attracted to the question of providing means for carrying into effect such municipal improvements as may be necessary or desirable for the security or comfort of the numerous opulent and populous towns throughout India.

“It has occurred to His Lordship in Council, that as the town duties have now been given up within the Presidency of Fort William in Bengal, the inhabitants of the large towns may fairly be called upon to contribute to defraying the expense of such improvements, as are required for their own convenience; and that within the Presidencies of Fort St. George and Bombay (where the town duties have not yet been given up) it may be proper that a portion of that impost may be reserved, when the boon that has lately been granted to the towns of the Presidency of Fort William in Bengal may be extended to those of Fort St. George and Bombay.

“It is desirable, in the opinion of the Governor General in Council, that some general plan should be devised to meet the municipal contingent expenses of the nature adverted to, and, in order to obtain the best available materials for forming an opinion on the subject, I am directed to request that you will, with the sanction of the Right Honorable the Governor in Council, obtain replies from the several Magistrates within the Presidency of Bombay to the following queries :—

“1st.—In the large towns of your district, what method is resorted to for repairing the walls and streets, for promoting the cleanliness of the town, and for the general preservation of the health and comfort of the inhabitants ?

“2nd.—If any tax or impost is collected for municipal purposes, be pleased to detail the nature and particulars of it, and the mode in which it is collected.

“3rd.—Is such tax or impost collected separately from or as a part of the town duties; and supposing these duties to be abolished, would such tax or impost be observed in them, or continue to be levied ?

"4th.—If the expense of clearing and repairing the town is charged to the town duties, how would you propose to defray the charge, in the event of the town duties being no longer available ?

"5th.—If you would propose to defray such expenses by means of a tax on the inhabitants, to what towns in your district would you propose to extend the plan, and by what means would you levy and disburse the amount, assessed,—whether by a committee of the inhabitants, or by means of the servants of Government, or by a committee composed of both classes ?

"6th.—Be pleased to afford the best information in your power as to the sum annually required for the clearing and repairing of the several towns, with your sentiments as to the least exceptionable mode of raising it."

2. Consequent on this communication, a circular was issued on the 4th July 1836, to the several local officers throughout the Presidency, calling for their reports on the points noticed.

3. The information elicited did not afford data sufficient to enable Government at once to frame a "general plan" of municipal taxation for the whole Presidency, and the preliminary inquiries which were essential to the maturing of such a scheme were not completed till 1840.

4. In the month of June in that year, the Bombay Government (Sir J. R. Carnac being Governor) submitted to the Government of India a scheme which provided for the abolition of the then existing town duties, and for their re-imposition on a modified system, the proceeds being appropriated "exclusively to purposes connected with the comfort, protection, and advancement of those persons by whom such duties would be paid."

5. The Honorable Sir George Anderson did not wholly concur with his colleagues in the Government regarding the propriety of this scheme. The following Minute, recorded on the 24th April 1840, and which accompanied the application to the Government of India alluded to in the preceding paragraph, will explain what were the views entertained by Sir George Anderson on the subject:—

"It is, I think, a question, if the Government determines to abandon the town duties as a source of revenue to the State, if a different system of taxation might not be framed, by which each town should assess itself its own taxes, according to its own wants.

"What is now proposed, and to be carried into effect by the new Draft Act, is the substitution of a more equitable mode of collecting town duties. The whole system of Chowkees and Chowkedars is still left. The array, as provided in the Draft Act, is still formidable,—vexation, abuse, cost still remain.

"It would be indeed a vast boon to the people if all this could be done away with, and if only each town were obliged to provide what each town requires should be expended on it for its own comfort and convenience. If this could be effected, the principle Government proposes to maintain would be a vast boon to the people."

carried out, to the vast benefit of all people, and to the prosperity of the different towns.

"There would be unquestionably difficulty in bringing about a system of this taxation by the people themselves; but I think, before determining to keep up these town duties, it might be worth while to see if such could not be carried into effect. The principle of course would be to put on a taxation according to each individual's income or profits.

"This might possibly be accomplished by a body, composed of a few of the principal inhabitants of a town, with the Government authorities, their acts being made subject to the confirmation of the Collector of the district.

"The difficulties are, perhaps, insuperable; but if they could be surmounted, I do not think there can be any question of the preference of such a system over one of those continued town duties, which can be managed only by Government officers, and which, even though free from abuses of corruption, if such be possible, yet can never be free from causing much vexation, and never be free from a part of the collections being lost in the expense of collection."

6. The Government of India intimated that, in their opinion, it was necessary totally to abolish the town duties as well as all the other extraordinary and multifarious exactions which existed prior to the passing of Act XIX. of 1844; imposts which, they remarked, "could in no modified shape be established without leaving a permanent load on industry and production."

7. And they suggested that the local municipal objects to which these taxes had been heretofore partially devoted should be provided for by the imposition of a house-tax assessed on rents; remarking that it was but "reasonable, if the inhabitants of large towns attach importance to keeping up the walls of such towns, and desire watching and lighting, in addition to the securities afforded by the general police, that they should be subjected to an impost for these purposes, in the form provided for the Presidency towns by Act of Parliament."

8. The different schemes which were proposed subsequently to the date of this letter, with the view of raising funds for municipal purposes, are described in the following extracts:—

Extract Paragraphs 37 to 41 of a Report by Mr. R. K. PRINGLE, Revenue Commissioner Northern Division, dated 19th September 1843.

"Para. 37. I am not disposed to recommend the abolition of any of these taxes (viz. the taxes alluded to in paragraph 6 of this summary), unless the objects to which they are applied, and which are all of public utility, can be otherwise provided for. But it may be well, if an arrangement is to be made, as is now proposed, for raising funds for such purposes on a general system, that these should be made to conform to its provisions.

"38. With respect to the number and names of the large towns in this Division in which it would be desirable to introduce special taxation for

municipal purposes, I have some difficulty in offering any decided opinion, without fuller local information; and I think it would be better to leave the selection of the places for after consideration, with reference to the circumstances of each. A not bad test, however, of the desirableness or expediency of such a measure, in its application to any particular place, may be obtained from the feelings of the inhabitants themselves; and this I observe has been resorted to in the Bengal Presidency.

"39. The Collectors of Tanna and Khandeish do not consider that special taxation for municipal objects is required in any of the towns in their districts, though, in the former district, the towns of Tanna and Panwell, and, in the latter, Malligaum, Dhoolia, and Nundoorbar, immediately occur to me as places where it would be desirable; and further consideration would doubtless suggest others. The Principal Collector of Surat thinks that Surat, Randier, and Bulsar, in the principal division, and Broach, Jumbooseer, Anklesur, and Ahmode, in the sub-division, are the only places within his charge where the system could be introduced with advantage. The Collector of Kaira specifies Kaira, Kupperwunj, Neriad, and Oomriat, as most suitable for it, and Borsud, Mahunda, Mhatur, Mehmoodabad, and Dhakore as being so in a lesser degree. The Collector of Ahmedabad names Ahmedabad, Gogo, Vcerumgaun, Dholka, Dundhooka, Jeytulpoor, and Dhollera. In respect to all of these places, I have no doubt that the measure would be more or less desirable, and perhaps, on inquiry, others might be pointed out in which it would be nearly as much so; but I would repeat that it seems most convenient to leave the specification of places for separate and special consideration, and merely to advert to the circumstances which should regulate it,—and these appear to be the populousness and wealth of the place, and the wishes of the people themselves.

"40. A point somewhat more difficult to determine than the expediency, in any particular locality, of raising funds for local purposes, is the manner in which they can most advantageously be raised; and this is a point which the Government of India appears to have left less open for discussion,—a house-tax being, it would seem, assumed as the most eligible under all circumstances. In many of the middle-sized towns, and those which are without walls, and in places where there has been no very remarkable decline of prosperity, I am inclined to think that this might, upon the whole, be the most eligible plan. The Collector of Kaira has accordingly suggested rates of twenty and ten per cent. on the estimated rents of houses for the towns in his district, and I am of opinion that such a tax so assessed would probably be well adapted to places situated as those towns are, and might produce the required funds, perhaps in a manner less objectionable than any other. But the case is different in old and walled cities, such as Ahmedabad and Surat, where many of the largest houses are the property of persons in decayed circumstances. A tax assessed on houses in such places would either be extremely oppressive and unpopular, or, if adjusted to the means of the owners, would be a house-tax only in name, and would be subject to all the difficulties attending the

fair assessment of an income-tax. I am therefore inclined to think, that in such places the municipal funds might be raised in a much less objectionable and more popular form by an import duty on one or two of the principal articles of consumption. A tax on the single article of ghee, for instance, on entering the gates of Surat, might, I conceive, be made to yield an ample revenue for every municipal purpose, without being felt at all as a hardship by the better classes, on whom it would principally fall. Perhaps, however, this point, as well as the selection of places for municipal taxation, would be best left to the discretion of the local Government, who might determine the mode of raising the fund in each place with reference to local circumstances, and the feelings of the inhabitants themselves.

“41. As regards the management of these municipal funds, it does not occur to me that any better rules could be adopted than (as has been suggested by the Principal Collector of Surat) those which have been introduced into the Bengal Presidency by Act X. of 1842, with such trifling alterations as may be requisite to adapt them to the circumstances of the towns in this part of India; one of the principal of which, perhaps, should be that the application for permission to raise the funds should at the same time specify the manner in which it would be most acceptable to the inhabitants that they should be raised. I think it desirable in such matters to avoid very minute legislation, the great object being to carry the feelings of the people with us, and to assure them that our arrangements are intended solely and exclusively for their benefit, which will be best accomplished by leaving the local authorities at liberty, within certain limits, to adapt their measures to local circumstances. Were a plan of this kind well arranged, and directed by judicious and zealous public officers, I should be very hopeful, from what I have observed of the disposition of the people of this country, that it would soon acquire general confidence, and become so popular as to lead to its voluntary extension over a much larger number of towns than might at first seem probable; but nothing would more effectually impede so desirable a consequence than an unaccommodating preciseness in the mode of working the system.”

Extract Paragraph 11 of a Report by Mr. D. BLANE, Revenue Commissioner Southern Division, dated 16th October 1843.

“Para. 11. With respect to the towns in which a provision for municipal purposes is required, the lists received from the Collectors are exceedingly imperfect. Contributions in some shape are already, I imagine, in force to a considerable extent. In the Konkun, the practice of serving by turns to furnish a night-watch for the protection of the villages is very general. A fund for the support of village police is raised in parts of the Sholapore Zillah, and some arrangement of a similar nature prevails, I imagine, in other quarters, and in many of the larger towns. The poorest description of villages might be exempted; but in all of the better classes a small contribution for muni-

cipal purposes, on some improved system, might, I think, be advantageously introduced. If the house-tax can be appropriated to this object, it may suffice for the present wants of the village community; otherwise the inhabitants might be rated as for the poor-rates in England, the machinery employed for which would, I conceive, though I have not the means by me of referring to the details, be found to afford valuable hints for the assessment of any local tax, whether extended generally to all considerable villages, or confined to a few of the principal towns."

Extract Paragraphs 9 to 13 of a Letter dated 14th June 1845, from Lieutenant NASH, Superintendent Revenue Survey and Assessment in the Deccan, to the Revenue Commissioner Southern Division.

"Para. 9. The only point noticed in your letter on which it remains for me to offer my opinion is the general arrangement under which the house-tax it is proposed to introduce into large towns* should be 'assessed and collected,' and the application of the proceeds regulated.

"10. There can be no doubt, I think, respecting the reasonableness of compelling towns to pay for their own particular expenses,—their roads, police, lighting, &c. Nor do I see on what ground the landed property in towns can claim any exemption from bearing a share in the general expenses of the country. The great towns have, perhaps, a greater interest in the defence of the country than any part of it, and more need of our courts of justice; and why the valuable land contained in them is not taxed with the rest of the country has always appeared strange to me. I should advocate not only the adoption of the proposed plan of meeting the municipal expenses, but the introduction of a *ground-rent tax* in aid of the general expenses of the country.

"11. I observe that reference is made in the letter from the Government of India to an Act of Parliament, laying down rules for the manner in which municipal expenses are to be met in the Presidency towns in India. I have not been able to meet with any copy of the rules referred to; and without them I do not venture on offering an opinion in detail. I do not conceive that any great difficulty will be found in any town in classifying and taxing the houses under the direction of Punchayets. But it strikes me that it will be highly desirable that some Government officer should be *ex officio* a member of every body entrusted with municipal arrangements; that all misapplication of municipal funds should be punishable as if the funds were those of Government, the persons entrusted with the care and expenditure of the money being made liable to the penalties applicable at present by our Regulations to Government servants; and that, for the purpose of enforcing on towns the execution of their duties, the towns should be made liable to prosecution and fine wherever they are neglected.

"12. In the Purgunna of Indee, where I was employed this year, I found the most extraordinary misapprehension existing regarding the property in

houses. Many of the Mohturfa taxes have in effect become house-taxes in that part of the country. On the departure of an individual from a village, the Government tax is in danger. The Mamlutdar and Patels immediately put some other person in to *pay the tax*, and in a few years the house passes through the hands of half a dozen people. None of these take any care of the house, Government never repairs it, and the house in a few years disappears, while the ground still remains the property of some outcast, who re-appears again, perhaps, just as some enterprising shopkeeper has got leave to build on the ground.

“13. Such is the inconvenience connected with these revived claims, and such the difficulty all new settlers meet with in consequence of the confusion of titles in even villages, that to cure this evil alone I think a ground-rent tax throughout all towns and villages desirable. Where the tax cannot be realized by other means, I would enforce it by the sale of the land, and the buildings which stand on it. This would effect a transfer of the property, and so prevent many of the inconveniences now felt, and could hardly be complained of by any one.”

Extract Paragraphs 26 to 41 of a Minute by Sir GEORGE ARTHUR, dated 1st June 1844.

“Para. 26. I have never yet seen a Native town or village in which I was not forcibly struck by the great want of some systematic provision for cleansing the streets, the cause (as an immense mass of medical and other evidence will testify) of the greater number of the epidemic diseases which frequently commit such fearful havoc among the Native population. Want of funds is the reason invariably assigned for the neglected state of almost every town or village; but besides the universal defect of the means of enforcing public cleanliness, each place has its peculiar want—of repairs to the town wall, of a supply of water, or of something also equally necessary to the comfort, health, or security of the inhabitants, to procuring which there is always the same obstacle of deficiency of pecuniary means.

“27. The people are generally ready to contribute towards the requisite expenses, and would probably do more, if their exertions were directed on any fixed and recognised system.

“28. Mr. Pringle's remarks on the means of providing and applying funds for such municipal purposes (paragraphs 38 to 41) seem to me to be very judicious; but he lays, I think, too much stress on the necessity of proceeding no faster, and in no other direction than the wishes of the inhabitants may seem to render advisable.

“29. As far as adopting no measures but such as they will allow to be generally beneficial, and the propriety of which they will admit, I entirely agree with Mr. Pringle; but I am convinced that if we wait till the Natives move in the matter of their own accord, nothing will ever be done on many points which are of the utmost importance. They might understand the value

of walls to their towns in a disturbed district ; of wells where there is no water ; or of dhurumsalas where there is no resting-place for travellers ; and would exert themselves to procure them : but I doubt much if they would do the same to clean a town, or remove any cause of injury to the health of the community.

“30. I think, therefore, that the expression of a wish on the part of any proportion of the inhabitants should not be required as an indispensable preliminary to raising funds for municipal purposes.

“31. On this principle I have framed the Draft of an Act [vide Appendix A], for which it will be necessary to apply to the Government of India, as we have at present no general legislative provision under which the object in view could be effected, and something of the kind seems absolutely necessary.

“32. In the general outline of the Draft, the provisions of Act X. of 1842 have been borne in mind.

“33. In some respects, however, the principle of the Draft differs essentially from that of the Act.

“34. For the reasons just noticed, the Draft Act does not require that the inhabitants should take the initiative. I am convinced that if really left to themselves, the inhabitants would seldom, if ever, do anything effectual, as bodies, for the improvement of their towns ; and that unless provision is made for Government to take the initiative, in the event of the inhabitants neglecting to do so, the Act will be little better than a dead letter.

“35. I should, however, be content with obliging the inhabitants to do something ; and, if they were found willing to act, would leave the money to be raised and appropriated, as far as possible, in the manner most in accordance with their own wishes and habits, and best suited to the local peculiarities of the places concerned. On this subject I fully concur with Mr. Pringle in the following observations [vide foregoing extract, paragraph 4th].

“36. In accordance with these views, the Draft provides for raising the money required for municipal purposes in five several ways, according to the local peculiarities of the place affected.

“37. In large straggling towns, the first plan, that of a *ground-rent*, will, I incline to think, be found preferable to any other. It will also, I imagine, be found most consonant to local usage in many parts of the Southern Mahratta Country. There is, I think, much justice in the observations of Lieutenant Nash on this subject, in paragraph 10 of his letter No. 138, of the 14th June 1843, to the Revenue Commissioner Southern Division (where he argues on the absence of any good reason for exempting lauded property in large towns from any contribution to the expense of the State, as is so often the case at present).

“38. Provision is made in the Draft Act for imposing a *house-tax* (the method preferred by the Government of India) in two different ways,—one by a uniform rate per cent. on the rent or yearly value of the premises, the principle legalized in Act X. of 1842, and recognised in the house assessment in this island.

"39. In many of our large inland towns, however, it will be found difficult to adjust the house-tax on this principle, owing to the obstacles alluded to by Mr. Pringle in the way of ascertaining correctly the yearly rent or value of the houses, and, when ascertained, of assessing the houses accordingly. In many such cases, the ruder method of assessment not unusual in Native towns may be adopted with advantage: all houses in a town are to be classified into a few classes, every house in each of which is to be assessed at a certain uniform rate. This method of course is less correct, and open to many theoretical objections; but it is simple, and, while it admits of affording relief from the objections pointed out by Mr. Pringle to a house-tax, regularly assessed on the yearly value of a house, it gives less opening for favouritism and oppression on the part of local officials, in places where the European superintendence is of necessity not very minute.

"40. In old walled towns, I quite agree with Mr. Pringle that a light *import duty* on a few of the principal articles of consumption would be a less objectionable and a popular mode of raising the requisite funds, and in many situations they might be raised, with still less inconvenience, *by a toll* on vehicles and cattle. In the annexed Draft, therefore, provision has been made for the adoption of either mode of taxation.

"41. I quite concur in the observations made by Mr. Pringle in paragraph 41, regarding the necessity of avoiding minute legislation on this subject—of assuring the people that our arrangements are intended solely for their benefit; and, with a view to promote this object, of leaving the local authorities at liberty, within certain limits, to adopt their measures for working the system to suit local circumstances; and the provisions of the Draft Act have been framed, as far as possible, to meet these views, of the soundness of which there can, I think, be no question."

9. The Draft Act for providing funds for municipal purposes (referred to in paragraph 31 of the foregoing extract from Sir George Arthur's Minute), together with another Draft Act providing for the abolition of the irregular cesses which then existed, and for the enhancement of the rate of excise and customs duties on salt, was submitted to the Government of India on the 6th July 1844.

10. The objects contemplated in the second Draft Act were accomplished by Acts XVI. and XIX. of 1844.

11. In regard to the question of taxation for municipal purposes, no notice was taken by the Government of India of the proposals submitted by this Government until 1847.

12. On the 11th December of that year, the Bombay Government were informed that "the President (of India) in Council would not sanction the enforcement of a contribution to which the people of the towns in the provinces might be opposed, and which might prove oppressive and injurious to the general prosperity"; but would be "happy to consider any scheme by which

the communities of provincial towns might propose to provide voluntarily for their health and comfort, by such self-imposed taxes as do not partake of the nature of town duties and tolls on trades or professions, and cannot interfere with the freedom of trade or intercourse." A Municipal Act, framed upon this principle, having been passed for Bengal some years previously to this communication (viz. in 1842), the Government of India were requested to extend that enactment (No. X. of 1842), with some modifications, to the Bombay Presidency. This request was preferred in a letter dated 24th July 1848; but it remained unnoticed for a considerable period, and was probably set aside, like the application of 6th July 1844, referred to in paragraph 9 of this Memorandum.

13. In the latter end of 1848, however, the attention of the Bombay Government was earnestly directed to the subject of municipal reform by proceedings in the Belgaum Collectorate (then in charge of Mr. J. D. Inverarity), which will be hereinafter described. These proceedings afforded such satisfactory evidence of the willingness and ability of the people, under judicious direction and assistance, to undertake and carry out local improvements within their own districts, that it was considered of importance to obtain the early sanction of the legislature to the formation of municipalities in the provincial towns of the Bombay Presidency; and under these circumstances every possible opportunity was taken by the authorities (as is apparent from the numerous letters which were addressed to the Government of India by Mr. Secretary Lumsden between the 29th December 1848 and 31st December 1849) urgently and forcibly to draw attention to the want of adequate legislative provision for the systematic prosecution of measures of municipal reform.

14. The result of these repeated applications was the publication, on the 11th August 1849, of the Draft of an Act "to enable improvements to be made in towns," which, with some modifications, was passed, on the 20th of June 1850, as Act XXVI. of that year.*

15. The views communicated by the Government of India in the Resolution of 11th December 1847 (as described above, in paragraph 12) would, in their full strictness, prohibit every kind of productive local impost except a capitation or house-tax, and such a prohibition was apparently contemplated in the Draft Act of 1849, alluded to in the preceding paragraph. In consequence, however, of representations which were made to the Supreme Government as to the extreme feeling of dislike which was known to exist in many parts of India to the imposition of a house-tax, the Draft Act was subsequently modified, and the law was passed as it now stands, admitting of municipal

* It is remarkable that the measure, which was adopted in 1850 as Act XXVI. of that year, was *almost in every respect identical* with that which ten years previously had been suggested as a desirable measure by that eminent statesman Sir George Anderson (vide paragraph 5 of this Memorandum).

funds being raised either by house assessment, by the levy of town duties, or otherwise.*

16. It is here necessary to inquire what was the state of the provincial towns throughout this Presidency, and what provision existed at the time of the passing of this Act for defraying expenses connected with the promotion of municipal objects.

17. The condition of the provincial towns was prominently brought to notice in an elaborate Minute by Sir George Arthur, dated 25th September 1843 (Appendix B), and his representations as to their excessive filthiness and consequent unhealthiness were fully confirmed by the statements of all the officers with whom Government were subsequently in correspondence on the subject.

18. The suggestions of Sir George Arthur, for the removal of the evils which he pointed out, were embodied in a circular, which was communicated to the several revenue and judicial officers throughout the country; but the carrying out of remedial measures was subsequently suspended, in consequence of the expected adoption of some general legislative measure on the subject.

19. When Sir George Arthur's Minute was written, the Mohturfa and other imposts, which were abolished by Act XIX. of 1844, were still in force, and it has been before stated that the proceeds of these taxes used to be partially devoted to the expense of conservancy and ordinary town improvements. On the abolition of these cesses, however, the Government of India expressed the opinion that such charges should not be defrayed out of the general revenues of the State, and the local Government consequently adopted a resolution to afford "no assistance for the improvement of the towns under this Presidency, unless the inhabitants themselves come forward with reasonable contributions."

20. The effect of this resolution was not to improve the state of things described in Sir George Arthur's Minute; and though at a later period, viz. in the early part of 1850, Government permitted the disbursement by the Magistrates for local improvements of the proceeds of fines levied under Section XIX. Regulation XII. of 1827, and Act XXI. of 1841, it may be generally stated that, at the period of the introduction of Act XXVI. of 1850, the condition of the provincial towns in this Presidency, in respect of sanitary and municipal improvement, had fallen into utter neglect.

21. Exceptions to this statement may be allowed in different degrees with respect to the towns of Sholapore, Gogo, Ahmedabad, Dhollera, Nassick, Surat, Belgaum, and some other towns in the Belgaum Collectorate.

22. In the five first-named towns, systematic provision for local requirements appears to have existed from an early period, and such of the particulars regarding these local institutions as can be ascertained from the records of Government are below described.

* But when this alteration was made in Section VII. of the Draft Act, the necessity of a corresponding amendment in Section XII. appears to have been accidentally overlooked. This latter Section authorises the levy by distraint *only* of the arrears of house or land-tax.

SHOLAPORE.

23. In the town of Sholapore a Municipal Fund existed, formed by the proceeds of what was called the "Araba tax." This tax was a fee levied in the town and suburbs every Tuesday (being market day), at the rate of 3 pies on every large and 2 pies on every small shop, with a few exceptions. It was also levied in the form of a toll on certain articles of merchandize, at the rate of half an anna on every bullock-load, with a discount of 20 loads per cent. The toll was at one time levied on merchandize, whether imported or exported, or merely passing through the town. After the abolition of transit duties, however, the toll was exacted only on "Thul Mod" and "Thul Burreet," *i. e.* on goods brought from other places for sale at Sholapore, and on such as were purchased at Sholapore for transmission to other localities.

24. The Araba tax was originally imposed in A. D. 1790-91, by Ramchunder Shivajee, Mamlutdar of Sholapore, under the Peshwa's Government, to meet the expense of employing Rukwaldars for the prevention of robberies within the town, which were then of frequent occurrence. The proceeds of the tax subsequently came also to be appropriated to the repair of the dilapidated town walls.

25. On the passing of Act XIX. of 1844, this tax appears to have been swept away by the stream of general abolition.

26. In 1846, the re-imposition of the Araba tax was authorised by the local Government, with the consent of the inhabitants, for the purpose of completing the repairs of the town wall ; and this authority was renewed by Government in 1849. But though the tax was re-imposed for the special purpose of repairing the town wall, the proceeds appear to have been also applied to other municipal objects.

GOGO.

27. From a very early period funds for municipal purposes had been voluntarily raised by the inhabitants of Gogo from three distinct sources, viz :—

1st.—By the levy of a per-centage of 4 annas on goods imported into or exported from the town by land.

2nd.—By the levy of an anchorage fee of 4 annas on all boats, not belonging to the port, which put in there for water.

3rd.—By the levy of a per-centage of 4 annas on all imports and exports, whether by sea or by land.

28. The sums realized by each of these levies were formed into separate funds, under the designations of—

1st.—The Paj Dhurmadao Fund, or fund for the repair and construction of causeways and bunds, and also for charitable and religious purposes, such as providing food for indigent travellers, and supplying oil, &c. to shrines and temples.

2nd.—The Dhurum Tulao Fund, or fund for the repair and construction of tanks.

3rd.—The Town Wall Fund, or fund for keeping the town wall in repair, and also for making roads in the town and neighbourhood.

29. In 1849, however, the merchants and traders were induced to consent to an alteration in the system of taxation above described. In lieu of the levies by which the Paj Dhurmadao and Town Wall Funds were supported, and which were found to operate vexatiously, they agreed to the levy of a tax of five annas on each package of the following articles of trade, imported into or exported from Gogo, and of an anna and a half on each pack of wool and raw cotton sold in the town, or exported by sea. It was also agreed that the collections, instead of being sub-divided, as heretofore, under different heads, should form but one fund.

Cotton piece goods, Europe and country.	Sal ammoniac. Tea.	Silk, raw. Cloves.
Silk cloth.	Pepper.	Cotton twist and yarn, Europe and country.
Woollen cloth.	Copperware.	Quicksilver.
Cochineal.	Ivory.	Cardamoms.
False amber.	Shawls.	Myrobalans.
Indigo.	Brass sheets.	Vermilion.
Coffee.	Pachuck.	

30. The collections above referred to, or at least those on account of the Paj Dhurmadao Fund (which appears to be of most ancient date), appear to have been originally made by the Mahajuns or corporations of the trading community.

31. The collection and management of the Paj Dhurmadao Fund and of the other funds appear to have been subsequently undertaken by the Collector of Customs, with the consent of the Mahajuns and of Government, in consequence of the want of unanimity among the Mahajuns as to the appropriation of the funds.

AHMEDABAD.

32. The expense of municipal improvements in Ahmedabad was defrayed out of a local fund, raised by the levy of an import and export duty at the town gates on the articles specified below :—

<i>Import.</i>		Silk 1½ per cent. Ghee 2½ per cent.	
Groceries and spices, in all 223 articles.....	} One per cent.	<i>Export.</i>	
Sugar and sugarcandy		Cloth, cotton	} Half per cent.
Molasses or jagree.....		Silk	
Cotton cloths		Silk and thread	
Tutenage		Gurbh soot, &c.	
Ivory			

33. These duties, prior to the passing of Act XIX. of 1844, were levied under Regulation XII. of 1831, and under that Regulation the proceeds could only be applied to the construction and repair of the town wall.

34. After the passing of Act XIX. of 1844, no legal authority existed for levying these duties ; but Government considered that it would be unwise wholly to relinquish the means of carrying out works of a municipal character in the city of Ahmedabad.

35. As the city walls had been completed, the export duty sanctioned by Regulation XII. of 1831 was abolished by Government ; the import duty on cotton piece goods (which was represented to be productive of much inconvenience to the people) was also remitted, but the import duty on the other articles above specified (as it was paid without dispute) continued to be levied, and the proceeds applied to municipal purposes generally, instead of, as heretofore, only to the construction and repair of the town wall.

36. A further revision of the original system of taxation was authorised by Government in August 1851. On this occasion the tax of one per cent. was remitted on all the articles of grocery referred to in paragraph 32, with the exception of the six articles of sugar, sugarcandy, betelnut, pepper, cloves, and cardamoms. It was arranged that on these six articles, and on ivory and tutenage, the tax of one per cent. should be continued to be levied ; that on silk and ghee the tax of one and a half and two and a half per cent. respectively should also continue to be levied ; that the tax on jagree, instead of one per cent., should be an anna per jar or pot, and half a rupee per cart-load ; and that, in lieu of the taxes relinquished, the following imposts should be levied :—

One per cent. on cotton yarn imported.

Rs. 2 on each chest of cochineal imported.

Rs. 3 on each cask of ditto imported.

37. Disbursements from the Ahmedabad Municipal Fund, which is still called the Town Wall Fund, are made (always with the previous sanction of Government in each instance) under the supervision of a Committee composed of the Zillah Judge and the Collector.

DHOLLERA.

38. A fund for municipal purposes, formed by voluntary subscriptions, had existed in Dhollera ever since the year 1805 or 1806. It was first established by the exertions of Sir Miguel de Lima, Mamlutdar of the district.

39. The nature of the fees levied, and the mode of collection, are detailed in a foot-note.*

* *Amdanee (import).*

On goor, ghee, oil, castor, surseea oil, jeera, mustard, meetec, &c. each cart-load with four bullocks at 4 annas, and with two bullocks 2 annas ; each pothee-load and ass-load from "Charun de pal" at 1 pie and from others $\frac{1}{2}$ pice ; cotton, for each cart containing one dokra (large bale) at 1 anna ; kulla, kuppas, kuppascea, for each cart with four bullocks 4 annas, and with two bullocks 2 annas ; cloth or piece goods, on each cart with four bullocks 4 annas, and with two

40. The fund was originally formed for the construction and repair of tanks in the neighbourhood of Dhollera, where the scarcity of water at one time occasioned great distress. Latterly, however, the collections have been also applied to the construction of roads and bridges in the same neighbourhood.

41. The collection and management of the fund, until the year 1843, were vested in the Collector of Ahmedabad, under the control of Government. This arrangement is said to have been originally effected at "the understood desire" of the contributors. In 1843 Government authorised the appointment, for the management of the fund, of a Committee composed of the Mamlutdar, the Sir Karkoon of Customs, and four or five of the principal inhabitants; but the Committee were not vested with authority to make any outlay without the previous sanction of the Collector and of Government.

NASSICK.

42. In the town of Nassick provision for municipal purposes by means of a kind of shop-tax (Kurputtee) appears to have existed from an early date. The average annual proceeds amounted to about Rs. 700. But no information can be discovered on the records of Government as to the origin, constitution, or management of this local fund.

43. Of the five local funds above alluded to, that of Sholapore, as stated in paragraphs 23 to 26, was abolished on the passing of Act XIX. of 1844, and subsequently re-created. The other similar funds do not appear to have been at all affected by that Act.

BELGAUM.

44. The resolution of Government which is alluded to in the 19th paragraph of this Memorandum, to afford no assistance for the improvement of towns, "unless the inhabitants themselves come forward with reasonable contributions," was, with respect to Belgaum, followed by the most satisfactory results.

45. Being left to their own resources, the principal inhabitants of Belgaum, under the able guidance and advice of the Magistrate, Mr. Inverarity, formed themselves into a Committee, and in the course of four months constructed anew, in a solid and durable manner, all the streets and lanes of the town, the length of road thus made by them amounting in all to nine and a half miles. Subscriptions were raised to defray the expense of the work, and those inhabitants who did not subscribe to the general fund were left at liberty to "construct out of their own means the portion of the street immediately in front of their own residences." Nor was the spirit of improvement confined to Belgaum itself:

bullocks 2 annas; mango, khirnee, kokree, tamarind, ambolea, khaktee, and vegetables are exempted from fee on account of the Dhurum Tulao Fund.

Ruwangee (export).

On a cart with four bullocks, ditto with two bullocks, pothee, camel and ass-load, the fee is levied as in Amdanee; if the quantity be small, the fee is taken according to estimated weight. No fee is taken on surbarrah (bundle of firewood). For a cart-load of kuradee with four bullocks 4 annas is taken, and with two bullocks 2 annas.

in more than twelve hundred towns of the Belgaum Collectorate the inhabitants reconstructed the streets and roads at their own cost, and the inhabitants of nearly three hundred towns in that Collectorate expressed a strong desire to be assisted in the formation of local funds for municipal objects.*

SURAT.

46. Equally satisfactory at Surat, as in Belgaum, were the results which followed the resolution of Government to withhold, except as a grant-in-aid, sanction to expenditure for local objects.

47. The periodical outlay which, prior to that resolution, Government were in the habit of incurring on this account, having been discontinued, the community of Surat came forward with offers to provide funds for local purposes by means of self-taxation; meetings were held by the inhabitants, a Committee of four Native gentlemen of different persuasions were appointed to carry out details, and Government were requested, after much discussion and deliberation, to permit the following scheme of local taxation to take effect:—

1. Silk cloth and thread.....	}	on
2. Europe, China, and Bengal piece goods, and cotton yarn.		
3. Sugar, molasses, and jagree	}	per cent.
4. Lac		
5. Betelnut		
6. Copper and brass.	}	At
7. Black pepper		
8. Mangoes, at 2 annas per Surat maund.		
9. Ghee, at the rate of 4 annas per Surat maund.		

* Among the high encomiums which were bestowed on Mr. J. D. Inverarity by Government, and by the Court of Directors, for his laudable exertions in the Belgaum Collectorate, we find the following:—

“Mr. Inverarity deserves the highest credit for the zeal and judgment combined which have led to such gratifying results. They verify the opinion expressed only recently * * * that it is only where zealous and intelligent Magistrates exert their personal influence with the people that Government can expect the inhabitants of our large cities to take an interest in municipal matters, and to come forward to effect improvements for their own welfare, and at their own cost, the expense of which has fallen in too many instances entirely upon the Government.”—*Minute by Sir George Clerk, dated 18th November 1847.*

“Mr. Inverarity deserves the highest credit for his admirable exertions; and his success evinces what may be done towards directing the inhabitants of our towns in the path of municipal improvement.”—*Minute by Mr. L. R. Reid, dated 22nd November 1847.*

“We attach much importance to the efforts of Mr. Inverarity, who by his personal influence, exerted with judgment and address, so justly calling for our commendation, has accomplished so much at Belgaum.”—*Despatch from the Honorable the Court of Directors, dated 1st December, No. 38 of 1850.*

“These results are highly creditable to Mr. J. D. Inverarity, whose zealous and judicious exertions in the cause (of municipal reform) have already received our warm commendations.”—*Despatch from the Court of Directors, dated 18th February, No. 4 of 1852.*

10. Spirits, country, 2 annas per gallon.

11. Toddy, at $\frac{1}{2}$ anna per maund.*

48. Government were very desirous, as will appear from a Minute by Lord Falkland, dated 19th April 1849, of which an extract is given at the foot of this page,† to afford to local communities all possible encouragement in schemes of the nature above described. But in consequence of the total absence of legislative authority to the levy of local taxes, it was apprehended that difficulties would attend the collection of such cesses, and no immediate steps were therefore taken by Government for the formation of municipal funds, either at Belgaum or Surat.

49. On the promulgation of Act XXVI. of 1850, the Government of India directed that "great care should be taken by the local officers, and by the Government, that the Act is not put in force in any place contrary to the general wish of the inhabitants." In 1854 it was ordered, that before recommending the introduction of the Act into any town, the local officers "should endeavour to discover if the wish expressed is *real*," as well as *general*; and also "if there be no large body of influential persons who are, it may be silently, but resolutely opposed to the Act." Finally, the Honorable Court of Directors, in a despatch which was furnished to the Bombay Government in the early part of 1855, enjoined "that the Act should not be put in force in any place where the bulk of the population has not, after full acquaintance with its objects, declared unequivocally in its favour."

50. These instructions have been as far as practicable observed by Government. They were also communicated for the guidance of the local authorities, but with an intimation that the caution enjoined by the Supreme Government was not held to debar them "from exerting, within legitimate bounds, the influence which they derived from their official position, in inducing the principal inhabitants of the larger towns to co-operate in securing the benefits which the Act is intended to promote.‡

* These proceedings at Surat took place under the auspices of the Magistrate, Mr. P. Stewart.

† "It must be remembered that there is a material difference between the voluntary payment and the compulsory levy of duties like those under consideration. The one must be regarded as a mere *contribution*, which has been self-imposed by the inhabitants of a city or district, for purposes of general convenience, and even of necessity, and the local community are therefore the proper and only judges of whether it should be persisted in or rejected as vexatious. The latter being levied by the officers, and applied to swell the general revenue of the State, Government is more directly concerned in the question of the policy or general effect attending it.

"When Government refuses to defray the expense of sanitary and local improvements, it in point of fact recognises the right of communities to provide the necessary means of relief by recourse to self-taxation."—*Minute by Lord Falkland, dated 19th April 1849.*

‡ As bearing on the subject of the instructions to local officers mentioned in paragraph 50, the following extract of a letter from Mr. Secretary Lumsden to the Magistrate of Surat, dated 17th March 1849, may be here not inappropriately quoted :—

"It would seem to be a natural consequence of associating the chief merchants and inhabit-

51. Under these somewhat adverse circumstances, three hundred and thirty-six towns and villages within the Bombay Presidency were, at the end of December 1855, brought under the operation of Act XXVI. of 1850. The names of the places alluded to, and some interesting statistics relating to them, are exhibited in a statement which is attached to this Memorandum as Appendix C.

52. The statement, it will be observed, includes the towns of Sholapore and Gogo, and since the application to these places of Act XXVI. 1850, the local funds which are described in paragraphs 21 to 31 have been superseded. From the inhabitants of the towns of Ahmedabad, Dhollera, and Nassick (at which places also voluntary local funds exist), applications have been received for the introduction of the Act, and it is probable that the measure will be extended to these towns at an early period.

53. It has always been considered a matter of regret, that when Act XIX. of 1844 was passed, simultaneous provision was not made for taxation for municipal purposes. Of this omission a partial explanation can be discovered in the records of the Bombay Government.

54. It is stated in paragraph 9 of this Memorandum, that with the Draft Act which forms Appendix A was submitted to the Government of India a Draft Act providing for the abolition of the irregular cesses which existed prior to 1844, and for the enhancement of the rate of excise and customs duties on salt. These drafts were submitted with a letter dated 6th July 1844. But this communication does not appear to have been immediately brought under the consideration of the Legislature; for on the 27th July 1844 a separate Act (No. XVI. of that year) was passed, for increasing the excise and import duties on salt, and of this Act the preamble declares that "inquiries which have been instituted as to the origin and extent of certain town duties and local cesses within the Presidency of Bombay, with a view to their abolition [of which inquiries the result was the communication from the Bombay Government dated 6th July 1844] have not yet been completed."

55. The additional impost on salt which was ordered by Act XVI. of 1844, and the absence of any corresponding relief from taxation in other respects, occasioned considerable excitement in many parts of the country, and in Surat caused rather serious riots. In consequence of these disturbances, which were reported to the Government of India, they considered it necessary, without delay, to abolish town duties, &c. in the Bombay Presidency; and this

ants of a large and populous place with the local authorities in a Committee of Management, that if the conduct of European officers be distinguished by temper and discretion, they will always command the willing co-operation of the Native members in carrying out any measures for the general good. It seems equally to follow that the increased local consideration, which the Native members will not fail to derive from the performance of their novel duties, must result in their taking a lively and increasing interest in those duties."

The foregoing extract from Mr. Secretary Lumsden's letter may be regarded as an exposition of the intentions and expectations of the authorities when the subsequent instructions as described in paragraph 50 were issued.

measure was accomplished by a short Act (XIX. of 1844), which was suddenly passed on the 19th of September of that year.

56. In the then existing state of public feeling, it was probably considered unadvisable to take any measures which could be calculated to prevent or retard the restoration of tranquillity and general contentment (a result which was to be expected from the passing of Act XIX. of 1844), and this is the only explanation which can be suggested of the postponement of the necessary legislation for the provision of funds for municipal purposes.*

57. The taxes which were abolished by Act XIX. of 1844 were not such as a wise and paternal Government would impose or continue for ordinary fiscal purposes; but they are quite unobjectionable as local and municipal taxes, and, in fact, are precisely the kind of imposts which, under Act XXVI. of 1850, municipalities are empowered to impose *de novo* for purposes of local improvement.

58. If, therefore, instead of striking those taxes off the Government rent-roll, and leaving it to the members of each urban and rural community to combine and re-impose them after they had discovered the want of local funds by years of privation of all public improvements,—if, instead of the measure which was actually adopted in 1844, it could have been arranged to transfer the taxes in question from the Government books to those of municipalities,—there can be little doubt but that such an arrangement would have been attended with vast benefits to the country.

59. That an arrangement like the one here contemplated would, under ordinary circumstances, have been a perfectly practicable measure, is proved by recent proceedings in the Sattara territory.

60. The Sattara districts not having been yet brought under the Regulations and Acts of the Government of India, in these districts the cesses, which were abolished in the older provinces in 1844, are still levied on account of Government, except where such revenue has been voluntarily relinquished. It was suggested to Government by Mr. H. B. E. Frere, in August 1850, that as this revenue, which was estimated at upwards of one lakh and three thousand rupees, would cease to be collected by Government after the extension to the Sattara territory of Act XIX. of 1844, the means of promoting public improvements in the country would to that extent be lost, unless arrangements could be devised beforehand to guard against such a contingency. As Act XXVI. of 1850 had been passed a few months previously, it was considered that a great impetus would probably be given to the creation of municipalities under that Act, if Government consented to remit their claim to cesses abolishable by Act XIX. of 1844 in every town or village of which the inhabitants might agree to the re-imposition of the same, or similar imposts, with a view to the formation of municipal funds under Act XXVI. of 1850.

* Besides the absence of provision for local improvements, another evil was produced by the sudden manner in which Act XIX. of 1844 was passed,—it precluded a previous settlement of the claims of *Ilukdars*.

61. Government readily approved and sanctioned this proposal ; and the perfect success* which has attended the experiment is testified by Appendix C. From that statement it will appear, that of the total number of three hundred and thirty-six towns and villages to which the Municipal Act has been applied, so large a proportion as two hundred and ninety-two are places within the Sattara province.

62. The general progress which has been hitherto made in this Presidency in promoting sanitary and municipal reform cannot be considered satisfactory ; and the views of Government on this subject are explained in the following extract of a Resolution which was passed under date the 21st May 1855 :—

“ Government have no doubt that the little progress which has hitherto been made in bringing the principal towns and villages of this Presidency under the provisions of Act XXVI. of 1850 is owing, in a great measure, to the indifference of the Native communities to sanitary and municipal improvements, and their jealousy of being taxed for measures, the benefit of which their ignorance prevents them from appreciating.

“ But it is evident that the want of progress in this respect is also in many instances due to a want of interest in municipal improvement on the part of the officers of Government, and an absence of judicious and systematic efforts, by which the ignorance of the people regarding the intention and advantages of Act XXVI. of 1850 might be removed.”

63. In November and December 1854 the Bengal Government had under consideration the expediency of modifying Act XXVI. of 1850, to the extent of superseding the voluntary principle of that enactment. It was proposed to dispense with the necessity of a petition from the inhabitants of a town previous to the introduction of the Act, and to empower the local Government to put in force Act XXVI. of 1850 in any place within its jurisdiction whenever such a measure might appear advisable. This proposal was referred for the opinion of the Bombay Government, and was entirely approved by it, but appears to have been subsequently abandoned, on the ground that it was opposed to the views and intentions of the Honorable the Court of Directors.

64. As the little progress which has hitherto been made in this Presidency in procuring the adoption by Native communities of Act XXVI. of 1850 is unsatisfactory, so also is the mode of procedure by municipalities in carrying out the provisions of the Act in those places into which it has been introduced.

65. The Municipal Rules, which under Section VII. Act XXVI. of 1850

* The only difficulty which has occasionally arisen in carrying out the arrangements alluded to is connected with the question of compensation to Inamdars, and others, who have suffered loss in consequence of the abolition, by Government, of particular cesses, in the proceeds of which such Inamdars, &c. were sharers, or which they were previously empowered to levy on their own account. Government have resolved that all claims of this description shall lie over for the present, being meanwhile got ready for adjustment immediately on Act XIX. of 1844 becoming law in Sattara.

are framed for the guidance of municipal bodies, are at present drawn up by each municipal commission, on its formation, according to the best of its collective judgment and ability, and without any communication with commissions previously appointed, or information as to the rules in force in other municipalities. Under these circumstances, the provisions of the rules passed for the several towns are necessarily various and contradictory, and a source of confusion is thus opened, which has been found to be productive of much embarrassment.

66. In the plans of taxation which are proposed with the view of raising the requisite funds for municipal purposes, there is a frequent absence of all defensible principle; and with respect to the objects for which the Act is made use of, very great inconsistency is remarkable,—schools and dispensaries being maintained in some places, while in others such institutions seem to be unthought of.

67. Government have now under consideration what measures it would be expedient to adopt with the view of correcting these evils. The most obvious means of so doing, should it be found practicable, will, it is considered, be to introduce an agency of an organised nature, and co-operative throughout the Presidency, for the instruction of the people with regard to the real objects of the enactment, and for guiding them in its application, without interfering with their privilege of self-government under it.

68. As these objects are so intimately connected with the enlightenment and civilization of the country, it has been suggested that their inculcation among the people might be most advantageously entrusted to the agency which has just been organised for their general instruction, and on this point the opinion of the Director of Public Instruction has been requested by Government.

APPENDIX A.

DRAFT OF AN ACT PROPOSED BY SIR GEORGE ARTHUR
IN 1844.

An Act for enabling the Inhabitants of any Place of Public Resort or Residence under the Presidency of Bombay, not being within the limits of the Islands of Bombay and Colaba, to make better provision for purposes connected with Public Health and Convenience.

I. It is hereby enacted, that if it shall appear to the Governor of Bombay in Council that it is desirable to make better provision for the making or repairing, cleansing, lighting, draining, or watching, of any public streets, roads, drains, or tanks, or for effecting any other local purpose, with a view to promote the health, comfort, or convenience of the public, or of the inhabitants in any town, suburb, settlement, or place of public resort or residence, within the Presidency, it shall be lawful for the said Governor in Council to authorise the same in the manner following.

II. It is hereby enacted, that the Governor of Bombay in Council may, at his discretion, appoint any number of persons, being inhabitants of the place, or servants of Government in the place, or in the Collectorate wherein it is situated, to be a Committee for the purpose of effecting any local objects of the nature specified in the preceding Clause of this Act.

III. And it is hereby enacted, that all vacancies occurring in such Committee, from whatever cause, may be filled up by the remaining members, subject to the sanction of the Governor in Council, or of such other authority as the Governor in Council may appoint.

IV. And it is hereby enacted, that such Committee shall have power to raise, by any of the means hereinafter mentioned, the funds necessary for effecting the objects aforesaid: provided that the order of the Governor in Council appointing the Committee shall specify the particular means whereby such funds are to be raised.

V. And it is hereby enacted, that such funds may be raised by any of the following means:—

1st.—By a ground-rent, to be levied on all lands, houses, and premises within the limits of such town or place: provided that the order of the

Governor in Council shall fix the maximum rate per square yard, which shall not be exceeded.

2nd.—By a house-tax, assessed at fixed rates, on each class of premises in such town or place: provided that the order of the Governor in Council shall fix the number of classes under which all premises within such town or place shall be classified for assessment, and the rate leviable on each class, which rate shall not be exceeded.

3rd.—By a house-tax, assessed at an uniform rate per cent. on the rent or yearly value of all premises within such town or place: provided that the order of the Governor in Council shall fix a maximum rate per cent. on the rent or yearly value of the premises, which rate shall not be exceeded: provided, also, that not more than one rate of ground-rent or of either description of house-tax shall be raised in any one year, without the express sanction of the Governor in Council.

4th.—By a town duty, leviable on articles entering such town or place, for consumption therein: provided that the order of the Governor in Council shall specify the articles, and the rates of duty to be levied thereon, which shall in no case be exceeded.

5th.—By a toll on all vehicles and cattle entering or passing through such town or place: provided that the order of the Governor in Council shall specify the vehicles or cattle liable to toll, and the rates of such toll, which shall in no case be exceeded.

VI. And it is hereby enacted, that the Governor in Council shall in every case prescribe such rules for every Committee as may appear necessary for the proper collection and administration of the funds realized under this Act, and shall have the power of removing any member of every such Committee, on its appearing that the security or efficiency of the trust is in danger of being impaired; and in case of no person being named, within one month, by the remaining members of the Committee, to the satisfaction of the Governor in Council, to fill any vacancy in the Committee, however occasioned, the Governor in Council, or any officer duly authorised by him, may appoint any qualified person to fill such vacancy.

VII. And it is hereby enacted, that the general rules enacted for the collection of the Government revenue shall be applicable to the collection of rates or duties under this Act; subject to such limitations and restrictions as the Governor in Council may see fit to impose.

VIII. And it is hereby enacted, that the Local Committee may make all necessary contracts, and appoint such servants, with reasonable salaries, as may be required to carry out the purposes for which such Committee was appointed: provided that no member of any such Committee shall be personally liable in respect of any such contract entered into by such Committee. But the said Committee, and every member thereof, shall be liable for the misapplication of all monies collected by their authority, under this Act, in the same manner

as if such monies had formed part of the Government revenue, and as if the members of the Committee had been the servants of Government.

IX. And it is hereby enacted, that accounts of monies raised or expended under this Act shall be kept by every such Committee, in such form, and with such vouchers, and rendered at such periods, as the Governor in Council, or any officer appointed by him to receive such accounts, may from time to time require.

X. And it is hereby enacted, that the names of the Local Committee, and the nature, object, and maximum amount or rate of the taxes they are authorised to impose, shall be conspicuously written up in one or more places of the most public resort in the town or place in which such Committee shall be appointed, and a copy of this Act, in the Vernacular language of the district, with copies of all subsidiary rules enacted by the Governor in Council, or other competent authority, for regulating imposts levied under this Act, and of all accounts of monies so collected or expended, shall be kept in some public office in the town or place in which such Committee may be appointed, and shall be there open to the inspection of all parties liable to such impost.

XI. And it is hereby enacted, that no rate or assessment imposed under authority of this Act shall be invalidated for defect of form, and it shall be sufficient if in any such rate or assessment the property assessed shall be sufficiently identified, and it shall not be necessary to specify the name of the owner or occupier thereof.

XII. And it is hereby enacted, that it shall be competent at all times to the Governor in Council to dissolve any such Committee, and to appoint any person or persons to inquire into and report upon the conduct of such Committee, or of any members thereof, in the execution of their trusts; and such person or persons so appointed shall, in the execution of the duty entrusted to them under this Section, have the same powers as are possessed by Zillah Magistrates, to send for persons, papers, and records, and to compel the attendance or delivery of the same, and to examine witnesses on oath; and resistance to the authority, or non-compliance with the legal demands of such person or persons, acting in execution of the powers conferred by this Act, shall be punishable in the same manner as similar offences against the authority of a Zillah Magistrate.

APPENDIX B.

MINUTE BY THE HONORABLE SIR GEORGE ARTHUR,

DATED PARELL, 25th September 1843.

I have been very much struck, during my visits to the Deccan in the present and preceding year, by the excessive filth which was apparent in the neighbourhood of the habitations of Natives everywhere, but actually *on* the high roads, made and kept in order by the direct agency of Government.

2. The by-streets of the city of Poona are as dirty as those of the remotest towns; and of the numerous villages which I have passed through, in the course of several tours which I have made in different directions, to places at a distance from Poona, I have not seen a single hamlet which was an exception to my assertion. Some of the towns, such as Joonere, Narraingaum, and Kheir, were worse than others, though, from their greater size and importance, the contrary might have been expected; but *all* were filthy *in the extreme*.

3. I was told by intelligent officers with whom I have conversed on the subject, that the first impression which had been made on me would wear off as I became more used to the habits of the people; but this I have by no means found to be the case.

4. I was also told, that though there was much dirt outside, the habitations of the people were neat and clean within. The few opportunities I have had of judging have, however, by no means confirmed this assertion, unless it is to be understood *relatively* to the excessive dirt which is observable out of doors; and I can hardly believe that a people so totally regardless of order and cleanliness externally can be very attentive to them within their habitations.

5. Be that, however, as it may,—the dirt observable outside is amply sufficient to cause the most serious detriment to the health of all in the neighbourhood; and I cannot but believe that the pestilence which, in the various shapes of cholera, endemic fever, &c. continually commits such havoc in the villages of a province, the climate of which appears so remarkably healthy, must be in a great measure owing to the want of proper cleanliness and ventilation in the towns and villages; and this impression I find confirmed by the opinions of all the most experienced medical men with whom I have had an opportunity of conversing on the subject.

6. Much might be said on the moral effect of not enforcing, by every means

in the power of Government, habits of neatness, cleanliness, and order : a want of such habits is a mark and an effect of a low state of civilization ; but it is one of those effects which reacts, and becomes, in turn, one of a vast number of causes which tend to *keep* the people of a country in such a low state of civilization. This, however, is a branch of the subject to which I will here only allude, as I am content to rest my argument, for the necessity for Government taking active steps to enforce greater cleanliness, on the positive and evident physical evils which spring from permitting heaps of matter, obviously productive of malaria, to accumulate in places where large numbers of human beings are constantly exposed to its poisonous influence.

7. Act XXI. of 1841 gives to the Magistrate considerable powers for removing local nuisances, and enforcing cleanliness in towns and villages. If the Act be not found in practice effectual for the end proposed, its defects should, ere now, have been pointed out by the local officers. I am of opinion, however, that a more vigorous exercise of the powers it confers would go a great way towards correcting the evils complained of.

8. But there are some causes of a want of neatness and cleanliness in the villages which, it strikes me, are not capable of correction simply by the power conferred by this Act, and I will briefly notice them, with such additional remedies as suggest themselves.

9. I.—The want of properly made roadways in large thoroughfares. With the exception of a very few of the great streets in some of the larger towns near European stations, the streets are almost invariably destitute of made roads, and in the state into which an unmade roadway through a town would naturally fall, where no attempt is ever made to remove accumulations of dirt and rubbish.

10. It is often in such situations difficult, if not useless, to enforce on the owners of houses the obligation of each householder keeping the road in front of his house free from dirt or obstruction. Something may be done in fine weather, but, during the monsoon, the inequalities which are naturally formed in an unmade and undrained road become receptacles for mud, which, even without any addition from rubbish thrown in the street, is unavoidably formed by the action of the rain on the road itself, and the unburnt brick and mud of which so large a portion of the walls in every town are built.

11. In such situations, no effort of the neighbouring householders can keep the streets clean, and a necessary preliminary to enable them to do so is to make good roadways, with properly constructed side-drains, in all large streets and thoroughfares.

12. The principle of making such roads being once understood, the Natives in any town or village could easily construct them for themselves.

13. I have frequently seen a small stream passing through a town or village, containing water, perhaps, only in the rains, but at that season, and for a couple of months afterwards, forming, where the road crossed it, a slough, dangerous to carts, and inconvenient to passengers. A substantial drain or

small bridge in such situations would remove any obstructions of the kind, and might, in a great number of cases, be built by the villagers themselves, without any other aid than possibly a rough plan to work on.

14. II.—The dilapidated state of the village walls is a serious inconvenience to the villagers in other ways than by obstructing any thoroughfares which pass near them. I have heard it argued, that the general state of dilapidation in which we see the walls of villages in our own territories was a sign of the confidence of the inhabitants in the efficiency of the protection we afforded to their lives and property. I should doubt this conclusion for many reasons : the system of police is the same in a walled as in an unwalled village, and the former are certainly reckoned by the Natives the more secure from robberies by gangs, as well as petty depredators. The people of a thriving village often repair the walls of their own accord, and at their own expense ; and in Jagheer villages, in our own territories, much attention is paid to the state of the walls, though our police protects them as well as it does our own villages.

15. I incline, therefore, to think that the dilapidated state of the walls of most of our villages is caused by the circumstance of their repair not being the particular business of any one individual, and having, therefore, been much neglected since we have occupied the country, and so materially abridged the villagers' powers of self government.

16. There can be no doubt but that, even where the police is most perfect, good village or town walls are a most material assistance in preventing robbery.

17. Whether it would be worth while, for police objects, to go to any considerable expense for their repair, is another question ; but there can be no doubt that it is very desirable, and well worth going to some expense, to adopt any steps which would lead to their being either rebuilt, or entirely cleared away, and thus prevent them from being, as they usually are at present, a mass of shapeless ruins, blocking up pathways, and forming unsightly heaps of rubbish, and giving to every village, however thriving in other respects, an indescribable air of poverty and desolation.

18. In many parts of the Deccan, I am informed, the Mirasdars of the villages are bound to keep the walls in repair, each of the ancient Miras (Thulls) divisions of the village lands having a certain length of wall assigned to it, for the preservation of which, in former times, the owners of that Thull were, by the custom of that village, held responsible.

19. This custom was, I am informed, revived by Lieutenant Wingate, in several instances, in the districts formerly under his charge, and in several cases the villagers of their own accord agreed among themselves to repair their walls on the same system. Where the custom has once been prevalent it might probably be revived, without much difficulty, by the exercise of a little tact on the part of the local officers ; and in almost every case the inhabitants of a village would be found willing to execute for themselves a very large proportion of what may be required, especially if aided by Government in such points as the repair of the gateways or gates, or of those portions of the wall,

the obligation to rebuild which formerly fell on families no longer resident in the village.

20. III.—A very common cause of the ruinous appearance of the inside of a village is, I am informed, the difficulty of clearing or turning to any useful account spaces of ground formerly occupied by the houses of such families, and still held by custom to be their property, and to be reclaimable as building ground for his house by any member of the family who may appear to assert his right. Years may have elapsed since the family left the village, and all trace of its members may have been lost ; but the sites of their houses still remain covered with heaps of ruins, for the removal of which there are no public funds available, whilst no one will clear them for building or other purposes, owing to the difficulty of establishing a good title to the land.

21. The latter difficulty might probably be got over more frequently than it is at present, if the local officers would pay a little attention to the subject. Every search should be made for the owner of the spot, and every inducement held out to him, if not to return and build, at all events to clear and level or sell the spot of land. If no owner could be found, or if he persisted in leaving the spot of ground in its existing state, covered, as is usually the case, with heaps of ruins and rubbish, the Magistrate might proceed to clear it, under the provisions of Act XXI. of 1841 ; and if the materials removed did not cover the cost of so doing, the land itself would, I conclude, become liable, under the general regulations, and might be sold to defray the expense.

22. IV.—One of the most fruitful sources of malaria in and about villages, as well as an almost insuperable obstacle to enforcing order and cleanliness, is to be found in the patches of prickly-pear, the remains, probably, of former hedges, but which now serve scarcely any other purpose than that of harbouring noxious reptiles and vermin, and not unfrequently affording shelter to thieves.

23. The Natives are fully alive to the benefit which will result from extirpating this plant, and frequently make considerable efforts with this object in view.

24. In almost every case, probably, each villager may be made to clear his own lands, and places in the vicinity of his own house. Pieces of Government lands, or of land without an owner, may be cleared, in many cases, with the assistance of the Mhars of the village, receiving some kind of remuneration for so doing. A different arrangement may be required in almost every different village ; but there are few where the object may not be accomplished by the help of some assistance from Government : such assistance should, however, be given only in cases where the extirpation is effectual and complete.

25. If attention were paid to the points I have enumerated, and if the obligation of every householder keeping the public thoroughfares adjoining his habitation clear from obstructions and nuisances of every kind were then strictly and systematically enforced, I have no doubt but that in a very few years we

should witness a marked improvement in the external appearance of towns and villages in all parts of the country.

26. The attention paid to the subject must, however, be *constant* and *perseveringly* continued; otherwise it will be vain to expect any permanent improvement, which can only be the result of a change in the habits of the people.

27. Some of the measures above alluded to would require the assistance of persons possessing rather more technical skill than is usually to be met with in any of the district servants of Government, in the revenue or magisterial department; and the probability of success would be materially increased by the uniform supervision of an active and intelligent officer. I would suggest, therefore, that every Magistrate should be called on to state his opinion as to the possibility and probable expense of procuring the services of such a person to act as "Inspector" under his orders. The person selected should be chosen for his activity and energy, as well as for possessing some knowledge of the proper mode of making and keeping in repair streets and roads; and I have no doubt many such men might be found among the Natives as well as Indo-Britons and Europeans connected with the Engineer Corps, and the various Departments of Public Works.

28. His allowance should be sufficient to enable him to keep a tattoo, so as to be constantly on the move; as his duty will be to see that other persons (whether district or village officers, or other servants of Government), to whom the Collector and Magistrate had entrusted the superintendence of works for promoting such public improvements or cleanliness, did their duty, rather than to superintend the execution of any single work himself.

29. Whenever the Collector or his Assistants had directed the execution of any work of the nature above alluded to,—the making of a street, the building of a village wall, the extirpation of patches of prickly-pear,—the inspector might be deputed to give instructions, if necessary, as to the mode in which the work should be commenced, to state how it proceeded, or to report on its efficiency after it was said to have been completed. He might bring to the Magistrate's notice instances where the interference of the latter, under Act XXI. of 1841, was called for, and be deputed to see that orders issued under that Act had been efficiently carried into execution.

30. In certain cases, probably, his powers might be usefully increased, by creating him a Joint Police Officer in any particular town or district.

31. As regards the *expense* of carrying out such a system, a great portion of the manual labour might, in most cases, be performed by the villagers themselves either uniting for the purpose of executing any work of general utility, or acting under the compulsory power with which the Magistrate is armed, for the purpose of obliging every person to contribute, in a certain degree (by cleansing the street before his door, for instance) to public objects of the nature in question. It should be laid down as a rule never to excuse the people from doing anything not in its nature oppressive, which they can, by law or custom, be compelled to do for their own comfort or welfare. The

pecuniary aid of Government should be given only in cases where the unassisted effort of the inhabitants would not be able to effect the desired end.

32. All fines, levied under authority of any enactment for the promotion of such objects as are now under consideration, might be formed into a fund, and applied to purposes of local public improvement.

33. Where the benefit to the villagers themselves was obvious, they might often be induced to contribute money, if required, as well as labour.

34. In many parts of the country the Mhars and other similar classes pay a small annual tax to Government. The remission of this for a period will, I am told, frequently induce these people to do far more work, for the benefit of their own village, than the amount of the tax, if collected, would pay for.

35. Where no other mode of effecting the object in view presents itself than by applying to Government for an actual grant in money, the following points are worthy of remark, and should be impressed on Native subordinate officers :—

1st.—The extent to which the people will themselves contribute is always a strong argument of their opinion of the necessity of a work, and, consequently, a powerful inducement to Government to assist them.

2nd.—When pecuniary assistance is given by Government, it is generally better given to procure *materials* than *labour*, and *tools* rather than either, especially in large towns, where tools may be constantly required.

3rd.—No application should be made to Government for money, except on estimates carefully framed : their *form* is of little consequence, provided they fulfil the two grand desiderata of showing precisely *what is to be done*, and affording a correct index to its probable cost.

4th.—No estimate should be exceeded, except on the ground of some contingency having arisen which it was difficult to foresee.

5th.—Except in very particular cases, Government money should not be applied to execute works of a merely *temporary* nature.

36. But, after all, the provision of the funds is an object of less importance than that of inducing those who have the power to be of use to interest themselves in the subject.

37. It is to the Collectors and Magistrates, and their Assistants, that Government must chiefly look, for systematic attention to the points to which I have alluded ; *they* can best communicate to the subordinate Native servants of Government the impulse which is required to induce them to exert themselves in promoting such objects, and any general improvement must be the result of *their* constant attention to the subject.

38. During their tours in the districts, especially, they will have constant opportunities of pointing out to their Native subordinates what is required, and of securing their co-operation in effecting it. The personal interests of the latter mentioned class, as well as the pride they take in their own district or village, will soon be enlisted in the cause by any superior whom they may see

takes a lively interest in the subject ; and such an officer will seldom be at a loss for means of encouraging and rewarding those who have manifested particular activity or zeal in carrying out his instructions.

39. The substance of the above remarks, if concurred in by my colleagues, should be embodied in a letter, which should be circulated through the Revenue and Judicial Commissioners to all European officers, including officers of the Revenue Survey under their control ; and they should be directed to take such measures as they might think best adapted to make the wishes of Government known as extensively as possible among their Native subordinates.

40. One of the most efficient means of promoting the end in view would be the issue of a Circular Order in the Vernacular language, pointing out in detail the duties of district and village officers in promoting order and cleanliness in towns and villages under their charge, and the means which should be adopted for the purpose.

41. Each Collector and Magistrate might prepare such an order, founded on general instructions which he would receive from the Revenue Commissioner, and adapted to the peculiar circumstances of his own charge. The order, after approval by the Revenue Commissioner, might be lithographed, and a copy furnished to the officers of each town or village, and would form one of the standing orders in force for their guidance in the discharge of their duties.

42. If thought necessary, particular points might, in the usual manner, be constituted " Local Police Rules," which would render their enforcement more easy and certain.

43. The Revenue and Judicial Commissioners should be requested to pay particular attention to this subject in their tours, and the latter should notice it in their annual circuit reports.

44. They should issue similar instructions to the Collectors as regards noticing, in their general reports on the state of their charges, the progress which may have been made during the preceding year.

45. I may here remark that a plan, on a large scale, of the site of each village, showing the various roads and houses, would be in many ways of very great use, and might probably be very easily drawn up by the persons employed on the Revenue Survey now in progress. Something of the kind has, I believe, been done in some districts, but I am not sure whether on any regular system ; and the attention of officers superintending surveys might with great advantage be directed to the subject.

(Signed) GEORGE ARTHUR.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. XXVIII.—NEW SERIES.

CORRESPONDENCE

ILLUSTRATIVE OF THE

**PRACTICE OF THE PESHWA'S GOVERNMENT
REGARDING ADOPTIONS,**

AND THE

**CIRCUMSTANCES UNDER WHICH ADOPTED SONS COULD
SUCCEED TO PROPERTY HELD FROM THE STATE.**

Bombay:

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1856.

CONTENTS.

	PAGES
Memorandum placed by the Revenue Secretary before the Government. .	1 — 26
Government orders thereon, issued to the Inam Commissioner	27, 28
Further memorandum submitted by the Inam Commissioner Northern Division	28 — 58
Despatch from the Government of Bombay to the Honorable Court of Directors, forwarding the above memorandum.	59
Orders of the Honorable Court of Directors	60
Supplementary Report by the Inam Commissioner Northern Division ..	60 — 62
Orders passed by Government thereon.	63

ADOPTIONS.

Memorandum placed before the Right Honorable the Governor, regarding the question as to how far Government are bound by Unrecognised Adoptions on the part of Inamdars and others holding Liens on the Public Revenue.

In reporting on an Inam in the village of Bengree, in the old Hooblee Mahal, which was claimed by Swamee Rajacharia bin Nursewacharia, as assignee of the original grantee, the Inam Commissioner gave it as his opinion that as the assignment had never been sanctioned by Government, the most advisable mode of disposing of it would be to declare that the Inam should remain alienated so long as any male heirs of the grantee might exist.

2. In reference to this opinion Government in its reply, dated the 4th April 1845, No. 1499, observed that whether an Inamdar who held his Inam for himself and his descendants could alienate it from those descendants, or could, by any transfer to other parties, deprive Government of its right to escheat should the family become extinct, was a question on which much doubt had arisen, but that in the cases coming before Government it was as well to avoid, if possible, any discussion in respect to it.

3. In a letter dated 15th April 1845,* Mr. Hart, the Inam Commissioner, observed :—

“ 4. It has always been, and still is a standing rule that an adoption not sanctioned by Government gives the person adopting no right to perpetuate any alienation of Government revenue; and this rule has been, even within the last few days, enforced in the case of a claim made by one Tummunacharia Pooroheet, in which it has been decided that there seems no doubt of the antiquity and uninterrupted enjoyment of the Inam; but the claimant is an adopted son, and the adoption was never sanctioned by Government. This, therefore, is, *as has always been ruled* in the cases of the Southern Muratha Country Inams, fatal to the permanency of the alienation. Now if the more solemn ceremony of adoption (which vests in the person adopted a far stronger right to the whole of his adoptive father's property than

* This letter was written with reference to the letter quoted in the preceding paragraph.

he could have obtained to it, or to any portion of it, by any other means) be in the eyes of Government an insufficient title to an Inam, it follows *à fortiori* that the less solemn transaction of sale or gift must be so; and the declaration that unauthorised *adoption* gives no claim to continue an alienation of Government revenue, after the extinction of the lineal male offspring of its original grantee, must, of necessity, involve the rule that no unauthorised *transfer* or *assignment* by the grantee or his family can create a better title.

"5. Were not this view of the question taken, the declaration of Government above alluded to would be nothing more than a declaration that the standing rule of Government regarding adoption by holders of Inams might be nullified by a simple deed of gift, making over *to the adopted* son the Inam, &c. to which the ceremony of his adoption did not entitle him; and as this would be a glaring absurdity, it can only be concluded that, according to the existing rules, an Inamdar's rights to prejudice Government by alienating in *gift* or *sale*, to a stranger, an Inam hereditary to his family, is as little to be recognised as his right to do so by *adoption*.

"6. It may be objected that thus fettering the power of an Inamdar over his freehold will have an effect unfairly injurious to his interests, by rendering his property of less value than if it were a marketable one; but it should be recollected that Government, in thus vindicating its rights, is in fact acting on behalf of the heirs whose rights the incumbent of the Inam is invading. Moreover, the non-recognition of alienations of Inam lands need not be final nor absolute; for (as in the case of adoptions) only those alienations are invalid to which Government has not, in the first place, consented, as under certain circumstances it might and ought to do.

"7. It would be easy to propose a general rule which would secure the just rights of Government, without in any way interfering with those of the Inamdars among themselves, and thus obviate all difficulties likely to beset this subject in past cases, and point out a mode of settling the question as to when and how the permission of Government to alienate could be expected for the future. But as I am not sure that Government would approve of my further pursuing this subject, I have not at present ventured to do more than submit my reasons for thinking that there are no grounds for longer entertaining the doubt expressed in your letter to the Inam Committee No. 1499, dated 4th April 1845, quoted in the margin of the '1st paragraph.' (Quoted in paragraph 2 of this Memorandum.)

4. Mr. Hart was, in reply, informed on the 23rd May following, No. 2386, that "as your present duties will afford you many opportunities of observing how far and under what restrictions transfers of Inams of

all descriptions were effected and permitted during the late Government, you are requested to collect as many facts as you can during your present inquiries into Inams bearing upon this point, and submit them for the information of Government, in the shape of a report, at the end of the present year or early in A. D. 1846.

5. A suit having been instituted against Government by an individual named Krooshunrao Anunt Joshee in the Tanna Collectorate, in which the decision depended on the determination of the above question, references were made, on the 30th May 1845, to the officers indicated in the margin, in order to ascertain the practice obtaining in foreign Native States in this respect. The information sought by the reference was on the following points, viz :—

1st.—Whether the consent or sanction of Government was necessary to authorise the sale of an Inam, or the adoption of a son by an Inamdar or his widow.

2nd.—Whether Nuzur was levied on such occasions when permission was given.

6. The replies which were received from the above officers (see paragraph 5 of this Memorandum) having been communicated to Mr. Hart, to assist him in the preparation of the report called for on the 23rd May 1845, that gentleman addressed Government, on the 27th March 1847, a letter from which the following extracts are taken :—

“5. It may, I think, be concluded from the above letters, [from the officers alluded to in the margin of paragraph 5 of this Memorandum and their Assistants,] that as a general rule, among the existing Governments of India, no adoption is looked on as valid unless *previously sanctioned* by the Sirkar, and that the same restriction exists with regard to transfer of Inams by gift or sale, though frequently not enforced where the property of the Inamdar is small. The Poona records show that with regard to both transactions, a similar general rule existed under the Peshwa's Government, though often relaxed in practice, owing to the remissness or dishonesty of his local officers.

“6. That the same rule,* as far as it affects adoptions, was still observed, and that with increased strictness, by the officer to whose discretion the settlement of the Southern Muratha Country and Decan was entrusted after their conquest from the Peshwa, will be evident from the proclamation* and correspondence mentioned in the five next paragraphs.

* The Acting Agent for Sirdars explains “that Mr. Chaplin's proclamation, dated 12th August 1820, as Principal Collector and Political Agent in the Southern Muratha Country, does not appear to have been issued under authority from, or with the knowledge of Govern-

"7. The following is a translation of a Jahirnama published under the seal of the Principal Collector and Political Agent in the Soobha of Dharwar :—

" Proclamation by the Company's Government, issued at Soobha Dharwar, on the 12th August 1820.

"Whereas it was a fixed custom under the Peshwa's Government, that when any Desaees, Surdesaees, Deshpandes, or other Zemindars, or any Jagheerdars, Surinjamdars, Patels, Koolkurnees, Wurshasundars, Rozcendars, &c. wished to adopt heirs, they should acquaint the Sirkar, or one of its officers vested with full authority in their province, with their intention, and act, in adopting, according to his orders; and whereas, in consequence of the distance of this province from Poona, and the disturbances to which it has recently been subject, this custom has in some places been disregarded: It is, therefore, now made known to all men, that whatsoever holder of lands, Wutuns, cash, or Huks of any description under this Government, may wish to adopt a son, must represent the same at the Soobha (of Dharwar), and then, after an inquiry shall have been made into the rules of the Shasters and the usage applicable to the case, an order will be issued, which must be observed.

"Should any one make an adoption without permission, the Sirkar will not recognise it, and the adopted son shall not be allowed to hold any Huks, &c. under Government.

"Let all act with understanding of the above."

(Signed) "W. CHAPLIN."

"Dated at Dharwar, 12th August 1820."

"8. On the 25th March 1822, the Commissioner in the Deccan issued a circular* to the authorities subject to him, of which the following is a transcript, taken from the registry at Dharwar.

ment; but the propriety of publishing a notice of the kind was proposed by Mr. Thackeray, Acting Principal Collector and Political Agent at Dharwar, in his letter of the 30th of July 1820, and Mr. Chaplin, who was the Commissioner at Poona, replied in his letter of 4th August 1820 as follows :—

"For the reasons, however, stated by you, I am unwilling to set aside the adoption by the widow of the Dummul Desae; but with a view to prevent these irregularities in future, I beg that the proclamation you recommend may be issued, and that the present indulgence be not made a precedent."

These are the proceedings which led to this proclamation.

(Signed) H. E. GOLDSMID, Secretary.

* This circular does not appear, either on reference to the Secretary's or Agent's records, to have been issued under authority, or with the knowledge of Government.

(Signed) H. E. GOLDSMID, Secretary.

“(Circular.)

“‘To ST. JOHN THACKERAY, Esq.,

&c. &c.

“‘SIR,—It being desirable that the adoption of sons by widows should be reserved under the special control of Government in all cases, I have the honour to request that in future all petitions to this effect be in the first instance referred to me, accompanied by a statement of the circumstances of the family generally, the claims of the nearest natural relations, and the description and amount of the property of the deceased husband.

“‘No adoption by widows is in future to be admitted without the express sanction of Government.

(Signed) “‘W. CHAPLIN.’

“‘Poona, 25th March 1822.’

“9. In reply to this letter, Mr. Thackeray on the 30th March 1822 wrote as follows to the Commissioner:—

“‘SIR,—I have the honour to acknowledge the receipt of your instructions of the 25th instant, respecting adoptions.

“‘In order to prevent the misappropriation of escheats, it is, I suppose, intended that the widows of Khooshbakh inhabitants, as well as of Inamdars and Wutundars, should be prohibited from adopting sons without the express sanction of Government.

“‘I beg leave to transmit a translation of an opinion lately given on the subject of adoptions by the Shastree here.

“‘Hooblee, 30th March 1822.’

“The following is a transcript of the paper* which accompanied the above letter:—

“*Translation of Texts from the different Shastras relative to the Adoptions, with the Shastree’s Answers to Queries proposed to him on this subject.*

“‘Query 1.—Is it allowable for a widow to make an adoption without the command of her deceased husband, and has a son thus adopted the right of inheritance?

“‘Answer.—A widow may, according to the Dhurma Shindoo Shastrum, make such an adoption. It is written in the Dhurma Shindoo, “A woman may, even without the order of her husband,

* A good deal of this paper is irrelevant to the question under consideration, but the Inam Commissioner thinks it right to quote it at length, as the Commissioner’s answer (which is an important one) to Mr. Thackeray’s letter was written after a consideration of it.

perform a righteous act." Nunda Pundit denies this right to the widow, who, he says, is not at liberty to do anything without the order of her lord. In the Vednyaneshwura it is written that a widow can make adoption only when this has been enjoined to her by her deceased lord. The custom of this country authorises adoption by widows; the opinion of Dhurma Shindoo must, therefore, be considered in force here, and the son thus adopted entitled to succeed.

"*Query 2.*—In failure of heirs of a man's body, and on decease of his widow without making any adoption, are relations, such as brothers, cousins, &c. entitled to succeed? If so, on failure of them how is the property to be disposed of?

"*Answer.*—Under such circumstances, when division of the family property has been made, the father, the brothers, the cousins, then mother's relations, ought to succeed, according to propinquity; should division not have taken place, the brother and cousins have preference to the father, who succeeds before connexions by the mother's side; when division of family property has taken place, but the sharers live together, the claim of the brother is preferable to even that of the widow. A posthumous son would, of course, have a preference to his uncle. This is the law as laid down in the Vidnyaneshwura, in which book the bestowing in charity the possessions of Vuedika Brahmins dying without heirs, and the appropriation by Government of the property of all others, is [MS. illegible].

"*Query 3.*—State the custom under the late Government, with a few cases exemplifying that custom, as it related to Suwusthans; as also as regarding Zemindars, Patels, and Koolkurnees.

"*Answer 1.*—In the Dummul Suwusthan Muthoorabae adopted Sewappa after the death of her husband Vencuppaya.*

"*2.*—In the Ramdroog Suwusthan Radhabae adopted Ram Rao after the death of her husband Govind Rao.

"*3.*—In the Julleehal Suwusthan Lukshmunwa adopted Powana Naik after the death of Kukapa Naik.

"*4.*—The possessions of Patels, &c. were resumed if they committed grievous offences, and restored upon their paying a Nuzur. On death of the Koolkurnee in the Julleehully Talooka Hungul, the Wutun of the Koolkurnee was resumed, leaving enough for the support of the widow. The widows of Patels, &c. made adoptions after the decease of their husbands: the Koolkurnee of Oodugurry, Talooka Lukshmeshwura, was adopted in this way; the same

* Vencuppaya was hanged by the Duke of Wellington, by whose permission, sought for and granted, Muthoorabae adopted Sewappa.

thing happened in the Nowlgoond Talooka, where the present Koolkurnee of Doodwad was adopted by the widow after the decease of her husband.

“Sequestration of possessions of extensive Suwusthans does not appear to have ever taken place, even for heavy offences. Dunds and Nuzurs were paid, and the property, which had been withheld for a time, restored. Patels, &c. did not always meet with even this indulgence. The custom of the country certainly countenances freedom of election of sons in widows, whether of Suwusthans and Patels, &c.’

“10. To the above letter, with its accompaniment, the Commissioner, on the 21st June 1822, gave the following decisive answer* :—

“To ST. JOHN THACKERAY, Esq.,

&c. &c.

“SIR,—I have the honour to acknowledge the receipt of your letter of the 30th March, respecting adoptions.

“It is intended that all adoptions by widows, whether in the case of Khooshbash inhabitants or Wutundars, should be strictly reserved under the special control of Government. But it is not intended to prohibit adoptions by widows of the former class, unless under particular circumstances.

“The law of the Shastras may probably be found the same here as it is described in the enclosure of your letter to be in the Southern Muratha Country, but the practice was widely different, since the late Peshwa permitted adoption by widows in very few instances indeed. And it is universally admitted that in case of any sort of property emanating from Government,—as Wutuns, Inams, and everything not personal,—the previous consent of Government to the adoption by widows is indispensable to the succession of the adopted son. A more lax attention to the interests of Government in distant provinces, or from other causes, may have occasioned a deviation from this rule in the Southern Muratha Country, but, under the orders of Government, it is necessary that it should in future be attended to. The plea of religious obligation to adopt a son, either by men or women, has been proved to be entirely nugatory by several late instances here, in which persons, after having most anxiously sought permission to adopt a son, have declined it on being informed that the adopted son could not succeed to their Jagheer.

“I have, &c.

“Poona, 21st June 1822.’

(Signed) “W. CHAPLIN.’

* This answer does not appear, either on reference to the Secretary’s or Agent’s records, to have been issued under authority, or with the knowledge of Government.

(Signed) H. E. GOLDSMID, Secretary.

"11. The following circular* was issued by the Commissioner on the 17th October in the same year, the copy here quoted being that addressed to the Principal Collector of Dharwar :—

“(Circular.)

“‘To ST. JOHN THACKERAY, Esq.,
&c. &c.

“‘SIR,—In addition to the restrictions already in force regarding adoption by widows, I have the honour to request that in all ordinary cases, even where the claim of the widow shall be found in other respects admissible, she be required to prove that her husband had either himself declared his intention to make the adoption proposed, or had desired her to adopt. This principle is to be observed as a general rule, subject to such special exceptions as Government may see fit to authorise.

(Signed) “‘W. CHAPLIN.’

“‘Poona, 17th October 1822.’

"12. It is thus evident that the Commissioner, who was acting with full powers in the conquered territories, fixed it as a rule, to be invariably observed in the Southern Muratha Country, that no adoption, especially by a widow, was to be recognised, unless made with the express sanction of Government previously obtained.

"13. I have not the means of knowing whether Government has adopted regulations of such stringency for other provinces, but conjecture, from the tenor of the 64th paragraph of a letter, No. 9, from the Honorable the Court of Directors to the Bombay Government, dated 23rd June 1839, and quoted in the foot-note,† that the question of adoption by the widows of Inamdars has been under discussion in a general point of view, not restricted to only the territories conquered from the Peshwa; and that the result has been the approval of a general rule as stringent as that alluded to in the last paragraph. At any rate, it appears certain that no orders have ever been issued to modify or relax those prescribed for this part of the country in the

* This circular does not appear, either on reference to the Secretary's or Agent's records, to have been issued under authority, or with the knowledge of Government.

(Signed) H. E. GOLDSMID, Secretary.

† "64. The opinion of the Revenue Commissioner, founded on reports received from the various Collectors, was that the custom of allowing widows to succeed to the Inam in the event of the husband dying without male heirs, was fully established and recognised under the Native Governments, but that she was not at liberty to adopt an heir without the express sanction of Government, and in default of such adoption the Inam at her death reverts to the State."

proclamation and Commissioner's letter above quoted, which are, apparently, applicable to all holders of alienations of Government revenue, of whatever denomination.

"14. This rule of refusing to recognise adoptions, made without the consent of Government previously obtained, is by no means an obsolete one, but seems to have been generally enforced, at all events in this province.* But Government has not been equally decided in its opinion of transfer of Inams by gift or sale,† though I think it is capable of entire demonstration that at least as stringent a restriction should be placed on transactions of this nature as on adoptions.

"15. For if Government were to admit the right of an Inamdar to sell or give away his Inam, it would wholly annul the rule regarding adoptions, which, as has been seen above, it has hitherto insisted on, since an Inamdar need then only execute a deed of gift to his adopted heir in order to evade it. The adopted son would thus obtain possession of the Inam as an assignee, instead of inheriting it by virtue of his adoption, and the object of Government in discountenancing the latter ceremony would be defeated.

"16. This is such an obvious fact that it seems unnecessary to write more regarding it than to refer to my former letter on the subject, No. 133, dated 15th April 1845. ‡ Should Government be satisfied, after considering the additional matter now stated, that if transfers of Inams, &c. by adoption are to be subject to control, so also *à fortiori* must transfer by sale or gift, I shall beg for permission to submit for its consideration a rule by which the objects alluded to in the 7th paragraph of my letter above cited (No. 133) may be ensured, and the question as to the circumstances under which an Inamdar may be permitted to transfer his property by sale, gift, or otherwise, be placed on a less uncertain and unsatisfactory footing than at present."

7. Mr. Hart was informed, in the Government reply of the 30th September 1847, that the general tenor of the replies to the references made to the several Political Officers and Residents with Native States

"leaves no doubt on the mind of the Honorable the Governor in Council as to the correctness of the conclusion arrived at by you, that the previous sanction of the ruling authority is requisite to the validity of adoptions or alienations by Inamdars, in as far as they may affect property deriving its origin from the State.

"2. The Governor in Council is, therefore, of opinion that this

* See paragraph 4 of the Inam Committee's letter to Government No. 133, dated 15th April 1845, quoted in paragraph 4 of this Memorandum.

† See paragraph 2 of Government letter No. 1499, dated 4th April 1845, to the Inam Committee, quoted in paragraph 2 of this Memorandum.

‡ See paragraph 3 of this Memorandum.

principle should be formally declared and acted upon as the rule for future guidance, and he desires me, accordingly, to request that you will prepare and submit for the consideration of Government a rule of the nature contemplated in the 7th paragraph of your letter of the 15th April 1845, for regulating the exercise of this prerogative." (See paragraph 3 of this Memorandum.)

8. In obedience to the above instructions, Mr. Hart submitted, on the 29th March 1848, a draft of Rules for "regulating the manner and degree in which adoptions and alienations of Inam, &c. are to be recognised, on the part of Government, by its ministerial officers."

9. In the communication submitting these Rules, Mr. Hart observed :—

"5. The records of the Hindoo Government, to which ours has succeeded, show that the sovereign carried his interference with adoptions so far as not only to withhold his sanction from adoptions which he was not disposed to recognise, but to forbid the very ceremony, and even to order the repudiation of a child unauthorisedly adopted. But it seems to me that under our Government such a degree of interference as this would be unnecessary, impolitic, and unbecoming."

"11. The Rules which have occurred to me as advisable to regulate the exercise of the prerogative of Government with regard to adoptions and assignments consist of two kinds,—*first*, those which should be promulgated for the information of the public; and *secondly*, those which seem necessary for the guidance of the officers of Government, to enable them to give effect to the promulgated Rules with as much uniformity of procedure as may be possible. Separate drafts of such sets of Rules are now submitted. If approved of by Government, they might at once be introduced in the Southern Muratha Country, to test the manner of their working; but until this is apparent, Government should, of course, refrain from pledging itself to their perpetuation."

10. Copy of the correspondence (see paragraph 3 of this Memorandum) on this subject, commencing with the Inam Commissioner's letter of 15th April 1845, was furnished to the two Revenue Commissioners, with the Government letter of 24th April 1848, and their deliberate opinion requested on the Rules submitted by Mr. Hart. (See paragraph 8 of this Memorandum.)

11. On the receipt of their replies, the Rules were adopted, with such modifications suggested by them as were approved of, and such others as appeared to Government to be desirable: as they were to be introduced in the first instance into the Southern Muratha Country rather as an experiment than a final measure, the Revenue Commis-

sioner Southern Division was requested to give them immediate effect in the part of the country for which they were, in the first instance, to be made applicable :—

12. The following are extracts from such portions of the Rules as bear on the question of adoptions to Inams :—

“Whereas, according to the established custom of the late Government, continued in the Southern Muratha Country by the present Government, under a proclamation issued at Dharwar on the 12th August A. D. 1820,* the permission of the Sirkar was requisite to make any adoption complete, Government hereby declares its resolution to suffer no relaxation of this ancient established rule. But to show those persons who possess Inams or property of any denomination emanating from the State, and who adopt with the intention of continuing further than their own lines the possession of such property, how far the consent of Government is requisite for such continued possession, the following Rules are published :—

“ADOPTIONS.

“I. No adopted son will be recognised as having, by virtue of his adoption, a right to the possession of any property of any kind held from the State, unless the sanction of Government has been obtained previous to his adoption, and the regular Nuzur paid for it in cases where such is receivable by Government.

“II. When Government sanctions any adoption, it will do so on the assumption that such adoption is in conformity with the religious law and caste usages of the applicant, the customs of his family, and the rights of all other parties : should the party adopting by the adoption infringe such law, usages, customs, or rights, he will do so at his own peril. The sanction of Government is merely a declaration that Government has no objection of its own to the adoption of a certain person as a son by the applicant.

“III. The sanction of Government, when obtained, does not create any title which did not exist before, nor render valid one which was previously invalid ; so that if it be found, after an adoption has been sanctioned, that Inams, &c. are held without just title, they will be resumed by Government, notwithstanding they may have passed to the adopted son, or to any one holding from him.

“Adoptions.

“I. Residents at Foreign Courts, Political Superintendents, and Agents and Collectors, under the control of the Bombay Government, should receive for examination all petitions made by persons belong-

* See paragraph 1 of Mr. Hart's letter quoted in paragraph 6 of this Memorandum.

ing to their jurisdictions, for the sanction of the Honorable Company's Government, to adoptions.

"II. Each petitioner for sanction to adopt should be required to furnish with his petition the following statements:—1st, a genealogical statement of his family, showing the original grantee of each of his Inams, &c., and explaining the claims of all persons then living upon them; 2nd, a schedule of his estates and their value, classifying separately (1) his Inams, allowances, &c., held under the Honorable Company's Government in Khalsat Mahals; (2) his Inams, &c. held in Surinjam Mahals—distinguishing those which are grants by the Surinjamdar from those which are held independently of him and under Government; (3) those held under independent potentates. These schedules should next be referred for verification and inquiry to the officers in charge of the districts where the Inams, &c. held under Government are situated; and the amount of Nuzur, if any be receivable by Government on account of them, in case the sanction is given, should then be calculated by the ordinary scale.

"III. The officers above mentioned should refer each application, and the result of their preliminary inquiries, provided for in Rule II., to Government, by whom all cases will be decided."*

13. The proceedings of Government on this subject were reported to the Honorable Court on the 27th February 1849, and the subjoined is an extract from their reply of the 27th February 1850:—

"5. We have thought it necessary to refer the question involved in these proceedings for the opinion of the Government of India."

14. Under date the 25th July 1851, the subjoined communication was addressed to Government by Mr. Hart, the Inam Commissioner:—

"With reference to the Government circular [copied below in paragraph 22 of this Memorandum] dated 25th October 1831 (copy sent to the Political Agent at Dharwar, numbered 1549 of 1831 in the Political Department), conveying some instructions regarding the recognition of adoptions, I have the honour to beg for some further information.

"2. The rule laid down by the 2nd paragraph of the circular specifies, as essential to the adoptions to be admitted, that they should have been made 'with such forms *and sanctions* as may have been usual.' I observe that persons who claim Inams in consequence of adoptions have already commenced to disregard the latter of these conditions, and to argue that if they have been adopted according to their religious law, the Government is, by the letter above cited,

* The Revenue Commissioner Southern Division was informed by Government, on the 18th January 1851, that these Rules were to supersede all former Rules in the Southern Muratha Country.

bound to respect their adoptions. To me it seems that *the sanction of the Sirkar or ruling authority, obtained previous to adoption*, being throughout India regarded as a necessary condition, its necessity is *insisted on*, and not overruled, by the Government circular in question.

“3. The Government of Bombay has lately collected evidence throughout the whole of India [see paragraph 5 of this Memorandum] which has conclusively proved that the previous sanction of Government has always been one of the usual sanctions, and an indispensable one in an adoption made for the purpose of binding Government to continue to the adopted son any property emanating from the State. This, however, is not a fact lately discovered (though lately corroborated); it was known and insisted on for years before the date of the circular of 1831, as it has been since that period.

“4. It seems, therefore, impossible to regard the above circular as *itself* containing a sanction which is one of those, the *previous* existence of which it declares essential for the present recognition of an adopted son's right to succeed to an Inam. To suppose otherwise would be to suppose the letter as contradictory in its own terms as it certainly would be inconsistent with the standing customs of the country and of Government.

“5. The circular seems to me intended merely to convey information that Government, as a general rule, admits the right of succession in an Inam by a son adopted with the usual forms and and sanctions (including the sanction of the *Sirkar*); but that (besides its previous sanction for the *adoption*) the subsequent express order of Government is necessary regarding each of the tenures of a political nature (viz. Jagheers), especially under the superintendence of *the officers* addressed. It is, I think, simply a warning to *them* to be careful of the interests of Government with respect to the Jagheers under their charge, and is neither addressed to those officers (Collectors) who had to do with mere Inamdars, nor (if it were so) would it prescribe any change in *their* procedure.

“6. With this view of the case, all *Inams* of every adoptive father may, without further reference to Government, be continued, under the circular of 1831, to an adopted son who can prove that he was adopted legally, and with ‘the usual sanctions,’—including the sanction most usual and most indispensable, viz. that of the *Sirkar*; but a *Jagheer* cannot be given up, even after such proof, without further reference from each of the political authorities within whose jurisdiction the several portions of the adoptive father's Surinjams, &c. may be situated, and the express orders of Government as to what portions of them it is intended to continue, and on what conditions.

“7. I have the honour to request instructions as to whether or

not I rightly interpret the meaning of Government in the circular to which I refer."

15. The circular of 25th October 1831, quoted in the 1st paragraph of the preceding letter from Mr. Hart, was issued by Government under the following circumstances.

16. With a letter addressed to the Commissioner in the Deccan, under date the 28th December 1824, Captain Robertson, then Collector of Poona, submitted two petitions from Anoopoornabae and Luxmeebae Athgurrey, in which they each claimed the privilege of adopting a son; and as the continuance of some Inam grants was dependent on the permission granted to either, Captain Robertson deemed it advisable to solicit Mr. Chaplin's decision whether either and which of them should be allowed to adopt a son.

17. In reply to a letter from Mr. Chaplin, dated 18th January 1825, requesting to be informed of the value of their Inams, and whether the petitioners had any collateral heirs to whom the Inams would devolve in default of an adoption, and if so, whether they consented to allow of an adoption being made by the widows, Captain Robertson replied, on the 18th February 1825, that the Inams held by the Athgurrey family were those specified below, and that there were no collateral heirs who had any claim to the Inams in default of an adoption by one of the widows:—

The village of Dapooree, valued at	Rs. 400 per annum.
The village of Neerey, valued at	700 ,,
30 beegas of land at Kirkee	30 ,,
The Mokassa of Dharja.....	40 ,,

In all.....Rs. 1,170 per annum.

18. Copy of the correspondence quoted above was, under date the 21st February 1825, submitted by the Commissioner for the consideration and orders of Government, and it was decided in Mr. Chief Secretary Newnham's reply of the 4th March following, that "Inam lands being private property, it is desirable that the owner should be enabled to dispose of them as he pleases"; but as there might be danger in hastily altering an established practice, the Commissioner was requested to ascertain from Captain Robertson the established practice which existed throughout the country before and during the reign of the late Peshwa, both as to disposing of Inams by will and as to adoptions in such cases by widows.

19. The Commissioner accordingly submitted to Government, on the 19th May 1825, a letter in which the Collector of Poona stated (18th May 1825) that "during the Muratha rule the holders of Inams could dispose of them by will, in sale, or in any way they chose. In Bajee Rao's time,

the permission granted to widows to adopt sons was rare, but this originated in the apparent propriety of obliging the people to adopt the course which in Bajee Rao was rendered personally expedient in regard to the succession to the Musnud. Since it is in the power of widows or any description of holders to give away their Inam land, there seems to be no good reason for hindering them from securing it to an adopted son, or for obliging them to resort to any other mode of disposing of it not congenial with their inclinations."

20. In their reply of the 3rd June 1825, Government concurred in the adoption of the child by the widows in question, and admitted as a general rule in the Deccan, that "children adopted with such forms and sanctions as may have been usual should succeed to Inam lands, or whatever may be considered private property."

21. In a Minute which was, under date the 14th October 1831, recorded by Lord Clare, the then Governor of Bombay, in the Political Department, it was observed that,—

"From several papers which have lately come before me it appears that the Collectors do not exactly know in what cases Government allows adoptions, and misconception on this subject has, I believe, arisen from the late discussions respecting a Nuzurana: to remove all doubt I think that the instructions of Government dated June 3rd 1825 should be re-published for the information of the Collectors and all concerned." (See paragraph 20 of this Memorandum.)

22. This Minute having been concurred in by the other Members of Government, the circular (referred to by Mr. Hart in his letter quoted in paragraph 14 of this Memorandum) given below was issued, under date the 24th October 1831:—

"Circular No. 1549.

"To _____.

"It having come to the knowledge of Government that some doubt exists as to the particular cases in which adoptions are allowed, I am directed by the Right Honorable the Governor in Council to communicate to you the following instructions for your guidance.

"2. As a general rule, in the Deccan, Government admits that children adopted with such forms and sanctions as may have been usual should succeed to Inam lands, or whatever may be considered private property.

"3. With regard to Jagheers, no adoption can have any effect, unless it is expressly so declared by Government.

"I have the honour to be, &c.

(Signed) "W. NEWNHAM, Chief Secretary."

"Bombay Castle, 24th October 1831."

23. Copies of the papers alluded to above were obtained from the Agent for Sirdars, in consequence of their not being traceable on the records of Government, having at some time or other been taken out and never restored.

24. As Government considered it of importance that they should have before them the proceedings, including the Minutes of Council, which led to the Government order No. 690, of 3rd June 1825 (see paragraph 20 of this Memorandum), being written, the numbers, &c. of the missing vouchers were communicated to the Honorable

Letter from the Commissioner in the Deccan, dated 19th May 1825, with enclosure, being a letter from the Collector of Poona, dated 18th May 1825.

Government reply to the Commissioner, dated 3rd June 1825.

Court on the 16th October 1851, and they were requested to furnish copies from the diary sent to them. The Honorable Court forwarded, with their despatch of the 18th February 1852, copies of the letters noted in the margin (transcripts of which had already been furnished by the Agent for Sirdars), but not of the Minutes of Council

which led to the Government order of 3rd June 1825 being written.

25. Transcripts of the papers received from the Honorable Court were sent to Mr. Hart, with reference to his letter of 25th July 1851, No. 3252.

26. In a Minute recorded under date the 3rd October 1850, on a transfer from the Political Department No. 3953, dated 23rd August 1850, relative to the resumption of the village of Bhatta, in the Surat Collectorate, the Honorable Mr. Willoughby stated :—

“There can be no doubt that the village of Bhatta was granted for the purposes specified in the deed of grant, which purposes are opposed to the right of alienation, and all chance of such grants reverting to the Government which made them is destroyed if alienation is admissible. I think the case is a very proper one to be submitted for the consideration and instructions of the Government of India.”

27. The Honorable Mr. Blanc, however, observed in a Minute (dated 9th October 1850) written on the same transfer, that—

“The question at issue would seem to be under reference to the Government of India from the Honorable Court,—vide their despatch No. 2, of 27th February 1850, paragraph 5, [quoted in paragraph 13 of this Memorandum,] and we may, therefore, I think, await the Honorable Court’s instructions previously to taking any further steps in the matter.”

28. It was finally resolved, at the suggestion of the Right Honorable the Governor, in a Minute dated 16th October 1850, concurred in by the Honorable Messrs. Willoughby and Blane, to address the Honor-

able Court and the Government of India on the subject. The following are extracts from the Minute in question:—

“It would, perhaps, be as well to forward the Honorable Court copy of our proceedings in the Revenue and Political Departments relative to the village of Bhatta, and to request that they will favour us with early instructions on the subject adverted to in paragraph 5 of their despatch of 27th February last, No. 2.

“In forwarding the Government of India copy of our despatch to the Court, we should again request their early attention to the subject.”

29. An application was, accordingly, made to the Honorable Court, under date the 29th October 1850, for their “early instructions on the subject adverted to in paragraph 5 of your revenue despatch No. 2, dated the 27th February last.” (Regarding the right of Inamdars to alienate their Inams by adoption or sale, without the previous consent of Government). Copy of this application was on the same date sent to the Government of India.

30. In paragraphs 8 and 9 of their reply of the 10th December 1851, No. 13, the Honorable Court intimated to this Government that,—

“8. We have not received from the Government of India a reply to the reference made to them for their opinion as to the right of Inamdars to alienate their Inams by adoption or sale without the previous consent of Government, and we are, therefore, not prepared to issue any instructions on the general question.

“9. In the present case, however, it appears from the Sunud that the village of Bhatta was granted in Inam by the British Government to Ramjee Appajee and his heir, for the specific purpose of providing him and his family with a place of abode and the means of support, and that, consequently, on the family becoming extinct, the village would, as a matter of course, revert to Government.”

The above extracts from the Honorable Court’s despatch were, on the 11th March 1852, sent to the Government of India, to the Political Department, and to the Inam Commissioner.

31. In a further despatch in the Political Department, dated 14th January 1852, No. 7, the Honorable Court observed, with reference to a decision by this Government in that department refusing to recognise an adoption by an inhabitant of Poona as conveying a right to any property which would otherwise lapse to the State, that—

“Your decision in this case rested on the principle of not recognising adoptions as conferring a claim to Inam or Wutun unless on grounds special to the individual case. This decision should be subject to any enactment which may hereafter be passed by the Legislature of India for regulating the succession to Inams.”

32. Under date the 22nd August 1845, Rugoonath Sudasew presented a petition to Government, praying to be recognised as the adopted son of his late uncle Sudasew Trimbuk, Deshpandia of Nassick.

33. The petition having been referred for the report of Mr. Langford, then Collector of Ahmednuggur, that officer, under date 30th September 1845, submitted to Government a letter from the Sub-Collector of Nassick, from which it appeared that a similar application had been made by Rugoonath Sudasew to the latter officer on the grounds of his having been adopted by his uncle Sudasew, but that it was not complied with, "as the adoption had not been sanctioned by Government; but he succeeded in his own right as next heir, being the eldest son of the younger brother of Sudasew Succaram, also deceased."

34. Both the Collector and Sub-Collector, however, saw no objection to the adoption being sanctioned in this instance.

35. As, however, the petitioner had a claim on the Wutun, whether as the son of his real or his adoptive father, Government recognised the adoption, but requested the Collector to instruct the Sub-Collector of Nassick to warn the Zemindars against allowing such adoptions without the previous sanction of Government, as in future they would not be recognised, and those concerned would be considered as guilty of a breach of their official duty.

36. The above proceedings having, under date the 24th December 1847, been reported to the Honorable Court, were approved of in paragraph 22 of their despatch No. 14, dated 13th September 1848; but the Honorable Court deemed it "desirable that a general notification should be issued, warning the hereditary district and village officers that adoptions made without previous sanction will not be held to convey any claim to the succession to their Wutuns."

37. The preceding extract from the Honorable Court's despatch was sent to the two Revenue Commissioners, who were requested, in conjunction with each other, to submit for the approval of Government a draft of the notification therein ordered to be promulgated throughout the several Collectorates under their control.

38. The Revenue Commissioner Southern Division replied to the above reference on the 6th December 1848, by referring Government to his letter No. 2408, of 9th August 1847, (see paragraph 11 of this Memorandum,) in which he "endeavoured to show that under the Peshwa's Government, the existing Native Governments of Western India, and the British Government, the right of the supreme power to permit or prevent adoptions, as regards inheritance of official rights of every description, has always been asserted and never questioned."

39. Mr. Townsend further observed, that "should Government admit this testimony, they may be of opinion that the issue of a proclamation

now to the effect proposed would be tantamount to an admission that the right had not previously existed, and that it would afford grounds for claims to inheritance by adoption without the sanction of Government, previous to the date of this proclamation, as a right."

40. Mr. Townsend's observations were concurred in by Government in their Minute of the 1st January 1849, in which it was observed that "if any notification is published, it should be as a warning that such is and ever has been the rule, and not that such will be the rule hereafter; but before giving any final orders, we may await the report of the Revenue Commissioner Northern Division."

41. The Revenue Commissioner Northern Division has now replied to the reference made to him. Mr. Fawcett requests to be informed whether the draft of the notification is still expected from his department, or the intention of Government of issuing a proclamation of the kind is superseded by the Rules (regarding adoptions by Wutundars) proposed by Mr. Hart, the Inam Commissioner, in his letter to Government No. 3035, of 16th January 1851, and approved of by Government in their letter No. 1343, of 14th February 1851.

42. On this letter the Right Honorable the Governor (with whom the Honorable Mr. Bell has concurred) has observed, that if the Rules are made generally known—and the Revenue Commissioners should see that they are—by the Collector, the publication of any special notification would appear to be unnecessary.

But the Honorable Mr. Warden has given it as his opinion, that—

"Until the Government receives the final orders of the Honorable Court of Directors, to be issued after hearing from the Government of India, [see paragraph 30 of this Memorandum,] it cannot be even said to be the rule that adoptions to the inheritance of Inams (the power to sell which proves them to be private property) require sanction.

"On the 3rd June 1825 this Government, in a letter to the Commissioner in the Deccan, 'admits as a general rule in the Deccan, that children adopted with such forms and sanctions as may have been usual, *should succeed to Inams or whatever may be considered private property.*'

"'With regard to Jagheers,' the Government adds, 'no adoption can have any effect unless it is so expressly declared by the Government.'

"The letter from which I quote, and which was always familiar to me as containing the principles on which we settled the Deccan, the previous proclamation of a Principal Collector notwithstanding, has just been sent to this Government by the Honorable Court, [see paragraph 24 of this Memorandum,] and I certainly consider that it will

be a violation of the terms conceded to the people of the Deccan at the conquest to lower the standard of Inams to that of Jagheers, and resume them from sons adopted without sanction."

43. With his letter of the 4th March 1852, the Agent for Sirdars has submitted a memorandum from Ambabae and Geerzabae, widows of Sheoram Gopal Raja Bahadoor of Malligaum, soliciting the continuance of certain Wutuns, Inams, and Babs, to their adopted son, Gopal Rao.

44. In forwarding the above memorandum, Mr. Brown states that—

"The late Chief of Malligaum held certain Wutuns, Surinjam, and a pecuniary allowance of Rs. 7,000 per annum granted in commutation of Umuls within the town of Malligaum. The Collector of Khandeish informs me that the Wutuns have been continued to the widows, and that the pecuniary allowance has been discontinued. The Surinjam has lapsed to Government on failure of direct heirs, and I have on the 28th ultimo submitted, for the sanction of Government, a statement of pensions to be granted to the family and dependents of the late Chief.

"3. The claim to the pecuniary allowance of Rs. 7,000 is the only question which would seem to require the decision of Government, and I beg to annex copy of a correspondence on the subject, as noted in the margin, and a translation of the Sunud issued to Raja Bahadoor by Captain Briggs, Political Agent in Khandeish, on the 8th March 1820. From these documents Government will perceive the tenure on which the pecuniary allowance was granted as equivalent for the Umuls in Malligaum retained by the British Government."

45. In a Minute (concurring in by the Honorable Mr. Bell) recorded on this case under date the 13th March 1852, the Right Honorable the Governor stated it as his opinion that "the adoption not having been recognised, the pecuniary allowance of Rs. 7,000 cannot be continued to the son," and that "whether it is to be continued to the widows for life must depend,—

"1st.—On the tenure on which the emoluments, in lieu of which the allowance was granted by Captain Briggs, were held.

"2nd.—On the question whether the pensions awarded from the Political Department have been fixed, or are to be fixed with reference to the probability of the allowance of Rs. 7,000 being continued during the lifetime of the widows. In other words, would the amount of pensions be greater or less according as the pecuniary allowance is or is not to be continued?"

On the latter point His Lordship has suggested—"information should be obtained from the Political Department before any inquiry is made as regards the former."

46. In his Minute dated the 18th March 1852 the Honorable Mr. Warden has observed that—

“The confirmation or otherwise of the adoption affects the question of the continuance or otherwise of the *Surinjam* only.

“The pecuniary payment is distinctly stated in the title-deed to be an *hereditary* grant in lieu of *Wutuns* ceded in exchange, and must, I apprehend, descend, as a matter of course, to the adopted child.”

47. Upon this, the following Minute has been recorded by the Right Honorable the President under date the 22nd March 1852, subscribed to by the Honorable Mr. Bell :—

“Assuming that the right as *Wutunee* is clearly established, it by no means follows we need recognise the adoption. The permission of Government is necessary before an adopted son can succeed to property held from the State.”

48. In a further Minute, dated 25th March 1852, the Honorable Mr. Warden has remarked,—

“Some correspondence between this Government (when Mr. Elphinstone presided) and the Commissioner in the Deccan has been received by the last Mail from the Honorable Court of Directors on this very point, and to which it might be well to refer before disposing of this case.” (See paragraph 24 of this Memorandum.)

49. ‘Venaik Wassoodeo Josee Chiploonkur petitioned Government on the 10th March 1852, intimating his having adopted a son. In reporting on this petition, the Collector of Poona observed that “under Section I. of the Rules forwarded to the Revenue Commissioner Southern Division with letter No. 1213, of 20th February 1849, [vide paragraph 12 of this Memorandum,] petitioner should have obtained the sanction of Government before the adoption, which he does not appear to have done.”

50. The Right Honorable the Governor has suggested (Minute dated 22nd March 1852, concurred in by the Honorable Mr. Bell) that—

“The Collector should be informed Government cannot dispose of the case in the summary manner he appears from his report to contemplate.

“Government wish to know whether there is any objection to the recognition of the adoption on the part of the co-sharer; also whether, in event of the adoption not being recognised, petitioner’s share will on his demise lapse to Government.

“Sufficient inquiry should be made as to the title by which the land is held to enable Government to determine whether there is

prima facie evidence of the tenure being such as to entail the necessity of Government continuing the land beyond the lives of present incumbents.

“The extent and survey valuation of the land should also be stated.”

51. The Honorable Mr. Warden has stated his opinion (Minute dated 25th March 1852) that in the case of Inams it is not necessary to the validity of an adoption that it be sanctioned.

52. In his letter No. 90, dated 26th February 1852, the Commissioner at Sattara has brought to the notice of Government that—

“The widow of Myput Rao bin Janajee Gorpuray has presented a petition, praying that she may be allowed to adopt one of the three sons of her husband’s brother, Dondjee, to inherit her fourth share of 7 beegas 14½ pands of land, yielding Rs. 34-2-9, granted in Inam by the late ex-Raja of Sattara, on the 7th July 1826, jointly to his relations Myput Rao and his brother Dondjee, and Mokoonda and Krushnajee bin Bapoojee Goojur.

“2. Dondjee and his three sons are heirs at law, and the adoption, if permitted, would have the effect of eventually distributing the half share of the Inam among the sons, Dondjee [s. o.] in proportions of one quarter and two-eighths, instead of three-sixths, to which there does not appear to me to be any objection.”

53. The following Minute has been recorded on this letter by the Right Honorable the Governor, with whom the Honorable Mr. Bell has concurred :—

“Inheritance of the deceased Myput Rao’s share by the nephew, whom his widow proposes adopting as a son, allowed.”

The above Minute has been subscribed to also by the Honorable Mr. Warden, who has, however, remarked—“she was, I imagine, entitled to adopt to the inheritance of an Inam without permission.”

54. In a report made under date the 22nd March 1852, on a petition presented to Government, on the 27th February 1851, by one Huree Anunt Hurdeekur, the Collector of Tanha stated,—

“The land claimed by petitioner was enjoyed by Anunt Bhut bin Gunesh Bhut Hurdeekur, who having died on the 4th January 1850, it was ordered by the late Collector, Mr. Law, to be resumed, which has been done.

“2. It is true, as stated by the petitioner, that Anunt Bhut, previous to his death, had petitioned for the continuance of the land in question to his adopted son, the petitioner; but his request was nega-

tived by Mr. Law, on the ground of the adoption not having been sanctioned by the ruling power.*

"3. The Collector sees no cause to recommend interference with the above decision."

55. The Right Honorable the Governor has proposed that the petitioner be informed that his application cannot be complied with; but the Honorable Mr. Warden has, in a Minute dated 6th April 1852, stated,—

"I am not aware that the adoption to inheritance to Inams requires sanction. To require such sanction is contrary to established usage, as recognised in the Deccan by Mr. Elphinstone."

56. In a petition presented to Government under date the 19th March 1850, one Narayen Bhut bin Gopal Bhut Kurvey stated that he was the adopted son of one Gopal Bhut Kurvey, who held as hereditary Inam the village of Nandoor Dussuk, Talooka Nassick, and prayed to be allowed to enjoy the same. Petitioner admitted that the adoption was not sanctioned by Government, but that "it took place under the impression, from the circular of 1831, that Inam should be considered as private property, and should revert to the adopted sons as private property." (Vide paragraph 22 of this Memorandum.)

57. This petition was referred by Government to the Revenue Commissioner Southern Division, who, in his report of the 19th June 1851, stated,—

"2. Petitioner admits that his adoption (which occurred at Benares) did not take place with the permission of Government, as the obtaining of such permission was considered unnecessary. His Agent likewise has deposed on solemn affirmation that the adoption did not receive the sanction of the ruling authority; but asserts that it occurred in the year 1830, before promulgation of the orders of 25th October 1831, No. 1549 [quoted in paragraph 22 of this Memorandum]. The village of Nandoor Dussuk, however, has continued under attachment by the Sub-Collector of Nassick, pending the production of *proof* of the adoption.

"3. But it will be observed from the accompanying letter from the Acting Collector of Poona, dated the 11th instant, No. 1380,

* *Government Circular dated 19th November 1842, No. 3368.*

No. 3368 of 1842.

To the COLLECTOR OF DHARWAR.

SIR,—I am directed by the Honorable the Governor in Council to acquaint you that adoptions without the sanction of the ruling power at the time, by parties in the enjoyment of hereditary Wurshasun allowances, cannot be held to convey any right to such Wurshasuns.

I have, &c.

Bombay Castle, 19th November 1842.

(Signed) L. R. REID, Chief Secretary.

that by virtue of his adoption, petitioner, with two other adopted sons of the Kurvey family (Rugoonath Bhut and Gunesh Bhut), have been, and now are in possession of shares in the villages of Oorsee and Kurrungaum in the above Zilla, and also that the village of Nandoor Dussuk, alluded to in the petition, was in the same way *shared* by the family.

"4. The adoption of Rugoonath Bhut and Gunesh Bhut would seem to be equally questionable and deserving of investigation with petitioner's. The former's adoption is stated to have been solemnised at Benares in 1828, and the latter's in 1839, both without the sanction of Government; and the Agent states that he has no proof of the incumbent's titles by adoption, excepting the fact of their possession of their shares.

"5. It appears to the Revenue Commissioner that petitioner's argument as to the relative date of the adoption and the circular of October 1831 is not material; this circular appears to him simply an announcement of the views of Government on the subject, which were, apparently, acted on before it was thought necessary to issue the circular.

"6. On the general facts not only is there deficiency of information as to whether the forms alluded to in paragraph 2 of the circular quoted were observed, but there is not even proof that the adoption took place at all, further than the assertion of the party interested.

"7. If petitioner's adoption is to be rejected, the Revenue Commissioner is respectfully of opinion that the decision must affect his title to possessions in the Poona Collectorate also; and that the Inams inherited by adoption by the other parties (Rugoonath Bhut and Gunesh Bhut) are in a similar predicament. The Revenue Commissioner would, however, beg to suggest, before any final orders are issued in the case, that the Collector of Poona call on each of the parties above named for distinct proof of his adoption, referring, if necessary, to the authorities where it is stated to have taken place; and that, pending the production of such evidence, the villages of Oorsee and Kurrungaum be attached likewise."

58. The Revenue Commissioner's report was on the 1st July 1851 forwarded for the report of the Inam Commissioner.

59. Another petition, which was in the mean time received from Narayen Bhut Kurvey, having on the 7th November, 1851 been referred to Mr. Hart, that gentleman stated, in his reply of the 2nd December following, that "as the petitioner's claim will be affected by the decision of Government on the question submitted in the Inam Commissioner's letter No. 3252, dated 25th July 1851, (quoted in paragraph 14 of this Memorandum,) he has been obliged to delay, pending the

receipt of that decision, his report on the petitioner's case, called for in the Government memoranda Nos. 6842, 6972, and 9107 of 1851."

60. On this report the following Minute was recorded by the Honorable Board, under date 22nd December 1851:—

"This must await the receipt of reply to Government letter No. 160, of 16th October 1851, to the Honorable Court. The petitioner to be informed that his application is under consideration." (See paragraph 24 of this Memorandum.)

61. This was communicated to the petitioner in Government letter No. 21, dated 2nd January 1852, and the petitioner has again addressed Government on the subject in his petition of 1st April 1852.

62. Mr. Hart has now replied (letter No. 583, dated 20th April 1852) to the reference made to him on the 1st July 1851 (see paragraph 58 of this Memorandum) by stating that—

"It will be wholly impossible to come to any correct conclusion as to what course ought to be pursued with regard to the village of Nandoor Dussuk, until Government shall have given a determinate decision on two questions,—1st, whether or not the tenor of the Government circular No. 1549 of 1831 (dated 25th October 1831) is to be regarded as doing away with the necessity of an Inamdar obtaining the previous sanction of Government for the adoption of a son by whom he wishes his Inam to be inherited; and 2nd, if so, whether or not the circular letter in question is to be regarded as cancelled.

"2. On this subject, I had the honour of making a reference to the Chief Secretary, No. 3252, dated 25th July 1851 [see paragraphs 14 and 25 of this Memorandum]. But your reply, No. 2374 of 1852, dated 5th current, leaves me still in doubt; for if, as I understand the result of the political consultation of the 8th June 1825, an extract from which has been sent with your memorandum for my information, all Inams must of necessity descend to adopted heirs, even those to whose adoption Government had given no previous consent, then the universal practice not only of this Presidency, but of the rest of India, as recognised in Mr. Secretary Lumsden's letter No. 3833, dated 30th September 1847, [quoted in paragraph 7 of this Memorandum,] has been inconsistent with this Rule.

"3. The proceedings of this Government and of the Honorable Court of Directors, whenever they have involved this question in any case, appear to have been invariably based on the principle that the sanction of Government, declared previous to adoption, has ever been requisite to give an adopted son any right to inherit an Inam or *any* other property emanating from the State.

"4. This principle is one which has been observed for a long

series of years; its universality has been proved by reference to all the Native States in India, and its enforcement has been ordered by rules drawn up after long and careful deliberation on the part of Government and the Honorable Court; while, on the contrary, the principle which I (perhaps erroneously) deem to be embodied in the proceedings which accompany your memorandum No. 2374 appears to have been first enunciated on the 18th May 1825 by Captain Robertson, (who was mistaken in the supposed facts on which he grounded it,) to have been submitted without more investigation than he could have made in *one day* by Mr. Chaplin, and to have been immediately adopted by Government without further inquiry or deliberation than may have taken place before the 3rd of the next month.

"5. With respect to Mr. Chaplin's proceedings in this case, I would, with all deference and respect for his well known abilities and general correctness, beg that Government would compare what he writes in his letter of the 19th May 1825 with his orders quoted in paragraphs 8 to 11 of my letter to the Chief Secretary No. 336, dated 27th March 1847 [quoted in paragraph 6 of this Memorandum]. I think it will be seen that the proceedings of 1825 were neither on the part of the Commissioner nor Government so deliberate and well considered as the rule which both before and afterwards was declared, and which seems to have always been acted on—viz. that the sanction of Government, declared previous to adoption, is essentially requisite to give any adopted son such a claim *against Government*, for the continuance to him of Inams or any other property emanating from the State, as to bar the Government's right of escheat.

"6. Under these circumstances, I am respectfully of opinion that the petitioner's claim to the village of Nandoor Dussuk should be rejected, on the grounds that his adoption was not sanctioned by Government, and that it should be fully understood that the previous sanction of Government is still requisite in *all* cases of adoption to create any right against it.

"7. With regard to the villages of Kurrunjgaum, &c. in the Poona Collectorate, I would suggest that the alleged Inamdar's right in them be left to the regular inquiry of the Inam Commission."

63. The above embodies all the essential points requiring to be placed before His Lordship with reference to the general question involved.

(Signed) H. E. GOLDSMID,
Secretary.

15th June 1852.

To W. HART, Esq.,

Inam Commissioner.

SIR,—I have been directed by the Right Honorable the Governor in Council to transmit herewith copy of a Memorandum drawn up in this office regarding the question as to how far Government are bound to recognise adoptions on the part of Inamdars and others holding liens on the public revenue.

2. On reading over the Memorandum, His Lordship in Council can come to no other opinion but that Government have a right to reserve in all cases the power of granting or refusing such assent to an adoption as will confer upon the adopted son a title against the State.

3. Before, however, making any final order on this subject, Government must await the orders of the Honorable the Court of Directors, which, in their letters quoted in paragraphs 13, 30, and 31 of the Memorandum, they have promised to send after consulting with the Government of India.

4. In the meanwhile, His Lordship in Council has been pleased to resolve that all applications for adoption by Inamdars and Wutundars be assented to, except when there are special reasons for refusing assent,—such, for instance, as the past mismanagement of an Inam district or village, the misconduct of the Inamdar, Wutundar, &c., or the requirements of policy that the Inam or Wutun should be decreased or discontinued, or in cases where the title to a holding, though not clearly susceptible of disproof, is of such a suspicious nature as to render it advisable that Government should exercise the right of veto which, as above stated, the Governor in Council considers inherent in it. His Lordship in Council would refuse to perpetuate by adoption any secular cash or grain allowance, except where there are special reasons of a political nature, as in some of the instances occurring in Guzerat.

5. With regard to past cases, that is, cases in which Inamdars have already adopted heirs, the question of whose succession is submitted for the decision of Government in the communications replied to in those of this date, (Nos. 6027, 6028, 6031, 6036, and 6040,) His Lordship in Council has been pleased, pending the receipt of the Honorable Court's orders on the general subject, to disallow the title, as against Government, of adopted sons. This course seems more expedient than any other, as it will avoid the appearance of compromising Government to the continuance of liens on public revenue held by the persons adopting, while should the decision of the Court be favourable to the absolute right of succession by adopted heirs of Inamdars, any lands, &c. now taken possession of by this Government as lapsed can be restored to them on receipt of the Honorable Court's orders.

6. With the title of sharers in Inams, &c. as against *each other*, so far as this is affected by adoption, Government have, of course, nothing to do; the only question in any adoption case for Government to decide is whether or not there is any reason on the part of Government to admit the liability of the State to the demand against it of an adopted son, as though he were born in wedlock.

I have the honour to be, &c.

(Signed) A. MALET,

Chief Secretary to Government.

Bombay Castle, 14th September 1852.

Memorandum by the Inam Commissioner Northern Division.

No. 569 A OF 1855.

Poona, 26th May 1855.

The earliest evidence of the practice under the British Government as yet discovered has been found in the proceedings of the civil tribunals at Surat in A. D. 1814 and subsequent years, in a disputed case of adoption, involving an annual income of about a lakh of rupees, reported in Vol. I. of Borradaile's Reports, pages 181 to 202, in which case in every one of the courts, from the lowest to the highest, the sanction of the ruling power to an adoption was held to be essential.

2. Throughout and up to the termination of the rule of the Peshwas the aforesaid rule was of universal application, and so it remained under the British Government until on the 19th May 1825 the Deccan Commissioner, Mr. Chaplin, submitted a letter from the Collector of Poona, Captain Robertson, in which that officer stated that "during the Mura-tha rule the holders of Inams could dispose of them by will, in sale, or in any way they chose"; on which representation Government on the 3rd June 1825 admitted, as a general rule in the Deccan, that "children adopted with such forms and sanctions as may have been usual should succeed to Inam lands, or whatever may be considered private property."

3. It has not been found possible to discover any minute or record of the grounds upon which Mr. Elphinstone's Government issued the foregoing orders, and the only reasonable supposition seems to be that they either were issued under some complete mistake or misapprehension, or that in describing the necessity of "such forms and sanctions as may have been usual," the sanction of the ruling power was understood to be included as a matter of course.

4. That this last was the intention of the Government seems certain from a large mass of collateral evidence on record, which will be by and by described, and which, apparently, proves that the Government

could not have meant to dispense with that sanction which of all others had always previously been, and had been after inquiry publicly declared to have been the most essential to the transfer or disposal in any way of alienated public revenue.

5. These orders of Government appear, however, never to have been understood or acted upon in any uniform manner. Almost immediately afterwards the next Governor, Sir J. Malcolm, proposed that in all cases of transfer, adoption, &c. a certain amount of Nuzurana should be levied, and the records of Government contain numbers of applications and reports from the several local authorities regarding the transfer of Inams by sale and adoption.

6. Sir John Malcolm's Nuzurana scheme having been negatived by superior authority, in 1831 his successor, Lord Clare, found it necessary, in consequence of the doubt and misconception found to be generally prevalent, to reiterate on the 24th October 1831 the order quoted in paragraph 2 of this Memorandum.

7. But it is perfectly certain that the practice which has prevailed during the last twenty years has been, not that described in the order of 1831, but the one which was found in existence when the Peshwa's territories were acquired by conquest, which had previously been the only practice known throughout those territories, and which had been universally followed during the first seven years of British rule, until questioned, though, as above shown, not virtually abolished, under circumstances so extraordinary and contradictory that it is obviously impossible to base any argument upon them.

8. At length, with a view to the enactment of a law clearly defining the extent, if any, to which the transfer of alienated public revenue from one family to another should be permitted, a reference was made to the Honorable Court of Directors, who on the 22nd May 1850, in their revenue despatch No. 5, communicated to the Government of India the view they took of the general question. In paragraph 7 of that despatch the Honorable Court thus described what they understood to have been the general practice under the Bombay Presidency :—

“The general practice under this Presidency, as may be gathered from the various cases which have from time to time formed the subject of correspondence with that Government, has been to require the previous sanction of Government to adoptions by holders of Jagheer and Surinjam lands, but not to interfere in any way in the case of adoptions by holders of lands held as Inam or Suwasthan. The decision of the Bombay Government, founded on Mr. Hart's report, now renders the previous consent of Government equally requisite to the validity of adoptions by persons holding lands under the last-named tenures.”

9. Supposing such to have been the general practice, the Honorable Court in paragraph 10 of the despatch recorded the following opinion :—

“ We therefore concur in the view of the question taken by the Bombay Government, that according to the practice of existing Hindoo States, the previous consent of Government is requisite to the validity of all adoptions, so far as they affect succession to assignments of the public revenue. But it must be considered whether the British Government, having to so great an extent abandoned, or rather neglected to enforce, this rule in regard to Inams and some other tenures, can now to any and to what extent expediently exercise the right.”

10. The Government of India replied on the 30th July 1852, No. 15, to the effect that it would not in their opinion “be just and expedient either to alter the laws, or to extend the practice of requiring the consent of Government to the alienation of Inams or appointment of heirs to succeed to them, in any cases or classes of tenures in respect of which such consent is not now required by law or practice, or a stipulation to that effect is not now contained in the instrument creating the tenure.”

11. The Honorable Court subsequently, in their revenue despatch of the 23rd March 1853, No. 5, in communicating to the Bombay Government the aforesaid reply from the Government of India, issued the following instructions :—

“3. Under the opinion thus expressed by the Governor General of India in Council, we do not propose to direct any alteration in the existing practice in this respect, but we desire that in all cases in which by law or practice the grantees of public revenue, under whatever title held, have hitherto been restricted from alienating their possessions from the direct line of the original holder, such restriction may continue to be maintained. In order that our views on this subject may be more clearly understood by you, we transmit copy of the despatch in which the question was referred by us for the opinion of the Government of India.” (Revenue despatch No. 5, dated 22nd May 1850.)

12. Government have now finally to determine whether there are any, and if so what description of “cases in which by law or practice the grantees of public revenue, under whatever title held, have hitherto” been allowed without restriction to alienate “their possessions from the direct line of the original holder.”

13. During the examination and scrutiny of the revised lists of Deccan Surinjams, in which serious and manifold error has been found

to exist, I have had occasion carefully to ascertain from the Peshwa's State records the practice of the late Government in regard to the continuance of the various classes of alienations. The result of this inquiry in regard to Inams was submitted to Government in paragraphs 6 to 15 (below quoted) of my report No. 163, dated the 2nd May 1853. It does not seem necessary to refer on this occasion to any of the other descriptions of alienations, as the right to dispose of or transfer them without restriction has not, I believe, been even supposed to have ever existed :—.

"6. The system of record and accounts under the Peshwa's Government was a very perfect one—one of the most perfect, probably, ever devised ; but to be fully understood the documents themselves must be seen and studied. The outline given in the last paragraph will, however, I hope, convey some idea of the great value of the information afforded by these State records, for it is *on their authority* that I venture to believe alienations of revenue generally, and Inams particularly, to have been one thing in theory, while they were quite another in practice.

"7. I have framed and annexed to this letter the undermentioned four statements, containing a number of selected cases illustrative of the system which was in force during the last seventy years of the Peshwa's Government :—

" Statement A, of Inams resumed by the Peshwa's Government.

" Ditto B, of ditto continued to direct and collateral heirs under the authority of ditto.

" Ditto C, of ditto ditto to adopted sons under ditto ditto.

" Ditto D, of ditto transferred by gift or sale under ditto ditto.

" These cases form but a small fraction of those on record, but they will suffice, I apprehend, to prove that the Commissioner in the Decan (Mr. Chaplin), whose opinion Mr. Warden has quoted in the 3rd paragraph of his letter, was in error when he stated that the practice of the Peshwa's Government in respect to Inams was that the holders could dispose of them by will, in sale, or in any other way they chose. It seems to me clear that without the sanction of Government *even a son could not hold his father's Inam*, and that without such sanction any transfer of an Inam became null and void. It appears equally certain that the Peshwa's Government not only possessed the power of resuming Inams, but that the power was freely exercised, and it is further shown that Inamdars were not exempted from the payment of cesses, but that they contributed largely in this respect. In short, it is placed, I think, beyond a doubt that an Inam, though granted as a free gift in perpetuity, was resumed or continued, and was taxed at pleasure.

"8. The power of resumption seems to have been arbitrarily exercised ; but this is not surprising, for it could scarcely have been otherwise where the will of the sovereign had the force of law, and indeed *was* the law. Whatever may have been *the theory, in practice* Inams seem to have been interfered with in every possible way ; and it will be seen* that on an Inamdar's death even his son could not consider his holding secure without obtaining the special sanction of Government to the succession. It will be observed,† also, that political offences were punished by resuming the Inam of the offender, and that the punishment due to the actual delinquent was sometimes‡ *even inflicted on his relatives*. When it is remembered that the Muratha rule was one succession of usurpations, conquests, and intrigues for sovereign power, an estimate may be formed of the number of persons who suffered on this account.

"9. The documentary evidence thus obtainable being of such unquestionable authenticity, can scarcely be strengthened by individual testimony. The value, however, which attaches to any deliberately recorded opinion of Sir T. Munro is such that I should leave this portion of the subject incomplete were I to omit to make the following quotation from a Minute of his, dated the 16th January 1823, and *written after* he had effected the reduction and settlement of the *Southern Muratha Country*, now forming a portion of the Bombay Presidency, and that portion, too, in which more alienated land is claimed than anywhere else. Sir Thomas Munro thus expressed himself:—

"In this country, under the Native Governments, all grants whatever are resumable at pleasure ; official grants are permanent while the office continues, but not always in the same family ; grants for religious and charitable purposes, to individuals or bodies of men, though often granted for ever, or while the sun and moon endure, were frequently resumed at short intervals ; grants of Jagheers or Inam lands from favour or affection, or as rewards for services, were scarcely ever perpetual. It was rare that any term was specified, and never one or more lives ; but it made usually little difference whether the grant was for no particular period or perpetual,—the (Altumgha) perpetual grant was as liable to resumption as any common grant containing no specification of time ; it was resumed because it was too large, or because the reigning sovereign disliked the adherents of his predecessors and wished to reward his own at

* "No. 24 of Statement A, and Nos. 1, 4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 17, 20, 21, 23, and 24 of Statement B."

† "Nos. 4, 5, 6, and 22 of Statement A."

‡ "Nos. 9 and 14 of Statement A."

their expense, and for various other causes. There was no rule for the continuance of grants but his pleasure; they might be resumed in two or three years, or they might be continued during two, three, or more lives; but when they escaped so long, it was never without a revision and renewal. I believe that the term of their lives is a longer period than grants for services were generally permitted by the Native princes to run.'

"10. Statement D, of Inams transferred by gift or sale under the authority of the Peshwa's Government, contains a number of instances sufficient, I think, to prove that these transfers were valid only when sanctioned by Government. It is shown that this sanction was sometimes* conditional on the payment of a relief or Nuzur. How very fully the Government exercised the power of control can scarcely be doubted when we find that it extended to the transfer of a small portion of Inam land by Nana Furnavese† then in the height of his power, and when we see that a powerful feudatory like the Vinchoorkur‡ was subjected to the same restriction.

"11. The inquiries which I have made to enable me to prepare this report have placed me in possession of valuable information elucidatory of the practice which existed under the Peshwa's Government in regard to adoptions by Inamdars. Statement C contains fifteen instances in which adoptions were sanctioned. In some§ of these cases the adoptive father had held a Surinjam as well as Inams, and both were continued on the payment of a relief (Nuzur); in others|| the succession was to Inams only, and even here it will be seen that Nuzurs were sometimes levied.¶

"12. The above evidence seems tolerably conclusive, but there is yet stronger proof forthcoming. I would solicit a reference to the instances specified below,** in *which adoptions were disallowed and Inams resumed, on the specifically recorded grounds of such adoptions not having been made with the sanction of the Peshwa's Government.*

"13. Under these circumstances there cannot, I apprehend, longer remain room for doubting the correctness of the opinion on this subject laid down by the Government in the Revenue Secretary's letter No. 6023, of the 14th September last, and which has been submitted for the final orders of the Honorable Court of Directors: it is, I think, clear, that in reserving to themselves the power of granting

* "No. 10 of Statement D."

† "Nos. 14 and 16 of Statement D."

‡ "No. 11 of Statement D."

§ "Nos. 8, 12, and 15 of Statement C."

|| "Nos. 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, and 14 of Statement C."

¶ "Nos. 1, 2, 6, 9, and 11 of Statement C."

** "No. 19 of Statement A, and No. 4 of Statement C."

or refusing such assent to adoptions on the part of Inamdars and others holding liens on the public revenue as will confer upon the adopted son a title against the State, Government merely exercise a prerogative which the Peshwa never for a moment relinquished.

"14. That with the information which is now forthcoming (only a small portion of which I have thought it necessary to embody in the several statements appended to this letter) before him, the Commissioner (Mr. Chaplin) would have ever informed the Government that the practice of the Peshwa's Government in respect to Inams was that the holders could dispose of them by will, in sale, or in any other way they chose, is, I conceive, out of the question; and I presume, therefore, that the knowledge must have been withheld from him by the hereditary Duftur Karkoons, most of whom must have been more or less acquainted with previous practice, and many of whom must have been able to refer to the recorded proof which was at hand, had they thought proper to do so. To one of these hereditary Karkoons I shall by and bye have occasion again to refer (paragraph 99 of this letter), and I would only here further remark, that what has apparently occurred seems to point out the necessity of extreme caution in matters of this description.

"15. It certainly seems to me that *bonâ fide* Inams are *now* held on a tenure far more secure and permanent than any which existed under the Peshwas, and the proof that such is the case is, I think, to be found in the recorded proceedings of the Peshwa's Government. But this is not all: it is only under the present Government that Inamdars have been relieved from the constant and heavy exactions to which they were previously subjected; the Native Government seems to have exacted from them largely, and if not quite as much as from some other classes, certainly as much as they required, or thought proper,—the difference was in many respects a purely nominal one. Inamdars did not, as a general rule, pay what was called Nuzur, though it was frequently levied from them, but they were made to pay in a dozen other ways, and the Government demands were, if resisted, realised by a summary process,—the resumption of the Inam. I give below nine of the heads under which levies from Inamdars were brought to account, the amount of revenue which was thus realised being shown by the accounts of the late Government to have been very large:—

- | | |
|-----------------------|------------------------|
| " 1. Inam Tizaiee. | " 6. Babool Puttee. |
| " 2. Kurz Puttee. | " 7. Swaree Puttee. |
| " 3. Ek Salee Puttee. | " 8. Ambeh Puttee. |
| " 4. Duhuk Puttee. | " 9. Doomalleh Puttee. |
| " 5. Inam Puttee. | |

“Of these, all save Inam Tizaiee have, I believe, been discontinued.”

14. Since the report from which the foregoing extracts are made was written, I have met with a remarkable instance of the unlimited power which the Peshwa's Government not only asserted, but exercised in regard to adoptions, in a Sunud issued by the Peshwa on the 23rd February 1799 (17th Rumzan, Teesa Teesain Mya wu Ulluf), and duly registered in the State diary, permitting the adoption of a son by a tailor not in the receipt of anything whatever from the State.

15. As I have hereinbefore stated, the practice of the Peshwa's Government was rigidly adhered to in regard to all alienations of the public revenue, during the first seven years of British rule. I now must advert to this fact in connection with the directly opposite assertions made by the Honorable Mr. Warden, as a Member of the Government to which he lately belonged. It seems to be of very great importance that the Government of India and the Honorable Court should have the real facts of the case before them, because Mr. Warden's statements must have had a great deal to say to the belief expressed by the Honorable Court that the general practice under the Bombay Presidency has been to allow the holders of Inams to dispose of them without any restriction; the more especially as Mr. Warden positively asserted such a practice to have prevailed during the period which of all others afforded the best and strongest evidence of that which had been found in existence at the termination of the Peshwa's rule.

16. Quoting from the memorandum, a copy of which accompanied the Revenue Secretary's letter No. 6023, of the 14th September 1852, I proceed to record the opinions enunciated by the Honorable Mr. Warden to which I have just referred. On the propriety of publishing a notification regarding adoptions made by the holders of public revenue, the Honorable Mr. Warden observed:—

“Until the Government receives the final orders of the Honorable Court of Directors, to be issued after hearing from the Government of India (see paragraph 30 of this Memorandum), it cannot be even said to be the rule that adoptions to the inheritance of Inams (the power to sell which proves them to be private property) requires sanction.

“On the 3rd June 1825 this Government, in a letter to the Commissioner in the Deccan, admits, as a general rule in the Deccan, that children adopted with such forms and sanctions as may have been usual should succeed to Inams, or whatever may be considered private property.

“‘With regard to Jagheers,’ the Government adds, ‘no adoption can have any effect unless it is so expressly declared by the Government.’ The letter from which I quote, and which was always

familiar to me as containing the principles on which we settled the Deccan, the previous proclamation of a principal Collector notwithstanding, has just been sent to this Government by the Honorable Court (see paragraph 24 of this Memorandum), and I certainly consider that it will be a violation of the terms conceded to the people of the Deccan at the conquest to lower the standard of Inams to that of Jagheers, and resume them from sons adopted without sanction."

On another occasion, when Government were called upon to recognise an adoption made without their sanction by the Raja Bahadoor of Malligaum, the Honorable Mr. Warden recorded the following dissentient Minute :—

"The confirmation or otherwise of the adoption affects the question of the continuance or otherwise of the *Surinjam* only. The pecuniary payment is distinctly stated in the title-deed to be an *hereditary* payment in lieu of *Wutuns* ceded in exchange, and must, I apprehend, descend, as a matter of course, to the adopted child."

And, again, in the case of a similar adoption made by one Wasoodew Joshee Chiploonkur, the Honorable Mr. Warden observed :—

"In the case of Inams it is not necessary to the validity of an adoption that it be sanctioned."

17. It has now to be shown that the principles on which the Deccan was settled were, in point of fact, precisely the reverse of those described by the Honorable Mr. Warden.

18. After the conquest of the country, one of the first questions submitted to Mr. Elphinstone by the Collector of Poona, Captain Robertson, was one regarding adoptions. On the 2nd August 1818 Captain Robertson explained, that under the rule of the last Peshwa adoptions by widows had even been altogether prohibited, and he inquired whether the practice of the late Government should be followed; to which Mr. Elphinstone on the 11th idem replied :—

"I beg the law may be kept as it was in Bajee Rao's time till there shall be full time to gather good opinions as to the Hindoo law; the present practice seems most consistent with reason."

19. The records of the Deccan Commission afford ample proof that from 1818 to 1825 Mr. Elphinstone's orders were attended to, for they are filled with applications to be permitted to adopt.

20. On the 20th August 1822 Mr. Chaplin, the Commissioner, submitted, with his own annual report on the state of the conquered territories, letters from the several Collectors affording information on various matters of importance connected with their respective charges. The Collector of Poona, Capt. Robertson, in paragraph 75 of his letter stated,—

"The sanction of Government was always indispensable to render adopted children the legal inheritors of the property of their adoptive parents."

21. The Political Agent in Khandeish at the same time informed Mr. Chaplin,—

"The sanction of Government was required for the adoption of children when any property was pending."

22. The Collector of Nuggur, Captain Pottinger, reported the sanction of Government to have been always necessary, not only to adoptions, but also to successions, "where the persons concerned were of importance, such as Jagheerdars, Inamdars, Zemindars, or great Soucars"; and he further explained that the practice had been kept up "under the late orders of Government perhaps more strictly than formerly."

23. The foregoing quotations (paragraphs 20 to 22) are from papers printed by order of Parliament, and they surely must be held conclusively to prove that the principles upon which the Deccan was settled were not those described in the Honorable Mr. Warden's Minutes.

24. Such continued to be the state of things, both in theory and practice, until May 1824, when (to use the words of the late Inam Commissioner, Mr. Hart, to whose clear reports on this subject I have found it possible to add but very little) a directly contrary principle "appears to have been first enunciated on the 18th May 1825, by Captain Robertson (who was mistaken in the supposed facts on which he grounded it); to have been submitted, without more investigation than he could have made in *one day*, by Mr. Chaplin; and to have been immediately adopted by Government, without further inquiry or deliberation than may have taken place before the 3rd of the next month."

25. But a number of concurrent circumstances lead me to believe that Mr. Elphinstone's Government never intended by their order of 1825 to alienate irrevocably a large amount of public revenue, the right of escheat to which had from time immemorial rested in the State; had always been rigidly and arbitrarily asserted; had been the subject of general and careful inquiry on the introduction of British rule; had been subsequently maintained (as Captain Pottinger stated) "perhaps more strictly than formerly"; and had been pointed out by Mr. Elphinstone, when Commissioner, as the great source from which a decided though gradual alleviation of these public burdens might be properly and confidently anticipated.

26. I have already shown that Mr. Elphinstone, just after the conquest of the Deccan, instructed the Collector of Poona to follow the practice existing under the former Government, "until there shall be full time to gather good opinions as to the Hindoo Law"; and I now have to beg attention to the opinions which were thus gathered, and

which were embodied in a summary of "the law and custom of Hindoo castes within the Deccan provinces subject to the Presidency of Bombay,"—which work was ordered by Mr. Elphinstone's Government to be printed on *the 29th July* 1826, and in which I find the following distinct definitions of the practice in regard to adoptions as affecting property held from the State, *i. e.* the public revenue:—

"Lands given in Inam, on failure of heirs, revert to the granter, whether Government or an individual Jagheerdar"—(page 235).
 "Widows may also adopt with the consent of the representatives of the granters of the Inam"—(page 185). "The consent of the Sirkar (Government) is necessary to adoptions by Wutundars"—(page 185).
 "Inamdars, exclusive of dancing girls, in making adoptions, must obtain the consent of the representatives of the granters, or, if the Inam land were granted by Government, of the Sirkar. Nuzurs were paid to the Native Government on occasions of granting permission to adopt"—(page 185).

27. Bearing in mind that the work from which I have just quoted was compiled at the desire of Mr. Elphinstone, for the express purpose of being, as it was, "circulated for a certain time as a book of information though not of authority," to be ultimately improved "by the decision of all doubtful questions, the removal of all glaring blemishes, and the filling up of all great deficiencies, until it forms a complete code of laws, sanctioned by Government and accessible in their vernacular language to all classes of its subjects,"—bearing all this in mind, and, above all, remembering that the authoritative circulation of this summary took place more than one year *after* the issue of the order of June 1825, it is surely but reasonable to conclude that it (the order of 1825) was either issued under some complete mistake or misapprehension, or that in describing the necessity of "such forms and sanctions as may have been usual," the sanction of the ruling power was understood to be included as a matter of course.

28. I believe the latter to have been the case, and this belief is greatly strengthened by the recorded proof of Mr. Chaplin having placed this construction upon the order, inasmuch as one of his last acts on the breaking up of the Deccan Commission in 1826 was, on the 8th June, to describe to the Collectors the returns they would for the future be required to transmit direct to Government, and in doing so to specify "more particularly reports of the deaths of the present incumbents of Jagheer, Surinjam, and Inam villages and lands."

29. That such instructions *could* ever have been issued had Mr. Chaplin supposed Government to have relinquished the right to control all the transfers of alienations, whether by adoption or otherwise, is, I conceive, out of the question; and this readily accounts for the doubt

and misconception the universal prevalence of which elicited Lord Clare's orders of 1831, which, again, became almost immediately a dead letter.

30. It has now, I think, been incontrovertibly shown that the principles on which the Deccan was settled were not those described in the Honorable Mr. Warden's Minutes; but I have yet to adduce the evidence on this subject recorded by Mr. Warden himself on the 26th July 1845, when, as Agent for Sirdars, in reporting on the claims of the Kudum Barclay family in Khandeish, he informed the Government (paragraph 7 of the Agent's letter No. 125, dated the 26th July 1845) "that Mr. Chaplin did not always, when in the settlement of this country he restored an Inam, mean that he gave it hereditarily, is shown by the accompaniment No. 2. I recollect having observed other examples of the same fact, though I cannot trace them on the records at the moment." The accompaniment No. 2, referred to by Mr. Warden, was a letter dated the 2nd June 1822, from the Commissioner Mr. Chaplin to the Collector of Nuggur, of which the following is a transcript:—

"I have the honour to request that you will restore the village of Wore (Inam), Purguna Nasik, to Saloobae, widow of the late Gunput Rao Worekur, with arrears from the date of resumption. The Wutuns of the family are also to be restored to her in the same manner.

"The lady has adopted a son, but the whole of the above grants are only to be held by the widow for life, and are at her death to lapse to Government, the adopted son having no claim to inheritance of this description."

31. The past and present practice in regard to the restrictions on holders of Inams and other alienations of the public revenue alienating them from the line of the original grantee may be briefly stated as follows. Such restrictions existed throughout the rule of the Peshwas, were enforced at the introduction of the British Government in 1817, and continued to be so enforced until June 1825, when an order was issued, which caused so much doubt and uncertainty as to require in 1831 an explanatory declaration, which seems never to have thoroughly taken effect, and which it is certain became a dead letter four or five years afterwards, from which time (*i. e.* from about 1836) the principles on which the Deccan was settled have been again steadily adhered to.

32. I have endeavoured to place this important fact clearly on record, as it is one regarding which the Honorable Court appear to have been completely misled by the Honorable Mr. Warden's Minutes: so far from it having been, as supposed by them, the general practice "not to interfere in any way in the case of adoptions by holders of lands held as Inam," such non-interference has been the exception to the rule strictly

enforced during the settlement of the country, and during the first eight and the last twenty years of our occupation of it, while during the greater portion of the intervening ten years (from 1825 to 1835) there was no uniform practice.

33. Such, then, having been the general practice heretofore, there cannot, apparently, be any difficulty, on the score either of the opinion expressed by the Government of India, or the orders received from the Honorable Court; and it will, I apprehend, be strictly in accordance with the sentiments expressed by both these authorities to continue to recognise in this matter no other principles than those in force for the last twenty years, and upon which the early settlement of the country was made, and no other transfers of alienated public revenue of any sort, whether by adoption or otherwise, than those to which the sanction of the ruling power may have been solicited and accorded.

34. The reference to the Government of India contemplated by the Bombay Government seems to have been now rendered unnecessary by the clear and explicit orders which have in the meanwhile been received from the Honorable Court, whose previous instructions left this Government in some doubt as to the construction to be placed on them. These doubts have now, however, been removed by the despatch of the 31st January last, No. 3, in paragraph 2 of which the Honorable Court have stated,—

“ We are decidedly of opinion that in no case should the alienation of an Inam be recognised for any term exceeding that for which the present holder and his heirs may possess an interest, and that the eventual right of Government to resume the revenue on the extinction of the family of the original grantee should be carefully maintained.”

This rule the Court have desired “ must be considered inviolable”; from which it results that no adoption tending to the perpetuation of alienations of the public revenue of this description can hereafter be recognised.

35. The necessity of diminishing by all legitimate means the enormous alienations of the public revenue in the Bombay Presidency has, I believe, at length been recognised. It is a fact that the concession by the British Government of these so-called rights has been accompanied by no retention of the obligations which attached to them, the consequence being the creation of a class which under the former Government did not exist; for under that Government the holders of alienations contributed largely to the public resources by periodical and other payments, and assisted, generally speaking, to some extent in the internal administration of the country. Mr. Chaplin on the 26th April 1821 informed the Bombay Government,—

"These Nuzurs formerly produced a very considerable revenue, the sum derived from them by the late Government during the last fifty-six years exceeding four crores and fifty-eight thousand rupees."

And even this large amount, which was that appearing in the public accounts, formed, Mr. Chaplin thought, "but a small part of the total collections under this head."

36. I close this report by an extract (paragraph 175) from a Minute recorded on the 21st September 1815 by the Marquis of Hastings, whose clear and convincing language, used forty years ago, seems to apply with redoubled force to the present state of things in the Bombay Presidency:—

"175. Of all subjects of taxation I should conceive the profits of rent-free lands the most legitimate. The holders of land of this description are at present exempted from all contribution, whether to the local police or Government by which they are protected, or to the public works from which their estates derive equal benefit with the rest of the community. They are indebted for the exemption either to the superstition, to the false charity, or to the ill-directed favour of the heads of former Governments and other men in power, and have little personal claim upon ourselves for a perpetual exemption from the obligations they owe as subjects. Most of the tenures may be considered invalid; indeed, the scruples which have saved the whole of these lands from indiscriminate resumption have given cause to admire as much the simplicity as the extreme good faith of all our actions and proceedings."

(Signed) T. A. COWPER, Captain,
Inam Commissioner Northern Division.

*Statement A (to accompany Captain T. A. COWPER, Assistant Inam Commissioner's Letter No. 163, of the 2nd May 1853)
of Inams resumed by the Peshwa's Government by Sunuds or Orders, which are registered or quoted in forthcoming
State Records, Diaries, Ledgers, &c.*

Number	Date of the Registry of the Sunud, or other Document referred to.		Description of resumed Inam.	From whom resumed.	On what account resumed.	Remarks.
	Arabic.	A. D.				
111th	Rubee-ool-Awul, Khumus Seetain.	1764-65	Inam land, and shares of revenue (Umul) in the village of Diggee, in the Neywasee Purguna.	Krishnajeel Nikkum Silledar.	For quitting the Peshwa's camp without permission.	
23rd	Zilhej, Teesa Seetain.	1768-69	Land in the village of Ghowreh, in the Konkun.	Bhaskur Joshee Kumla-kur.	No reason assigned.	
318th	Sufur, Sulas Subain.	1772-73	A portion of the village of Tullegaum, in the Trimbuk Purguna.	Balajeel Huree Joglekur.	Stated to be an offence of the most heinous nature, but not specified.	The whole village was at first resumed, but on the relations of the offender representing their innocence of any crime, <i>their shares</i> were restored.
421st	Rubee-ool-Awul, Arba Subain.	1773-74	Land in five villages in the Konkun.	Ramchunder Wirtul	For serving with Rugoonath Bajee Rao (Raghoba).	This Sunud must have been issued by one of the Ministers who opposed the pretensions of Raghoba, as it is dated during the period which elapsed between the

Number.	Date of the registry of the Sunud, or other Document referred to.		Description of resumed Inam.	From whom resumed.	On what account resumed.	Remarks.
	Arabic.	A. D.				
51st	Rubee-ool-Awul, Arba Subain.	1773-74	Land in the hamlet of Bhakudwaree.	Yessajee Dhoomal..	For serving with Rugoonath Bajee Rao (Raghoba).	murder of Narayen Rao Bullal and the birth of Mahadoo Rao Narayen, and during which Raghoba was <i>de facto</i> Peshwa.
629th	Zilhej, Suba Subain.	1776-77	The village of Purlee, in the Seeheemahal Turuf.	Trimbuk Suryajee.	Joining the standard of the impostor who personated Sudasew Rao Bhow, the Peshwa's cousin, who fell in the battle of Paniput.	This resumption must have taken place as above; the date of the Sunud is quoted in the ledger for the year Khumus Subain (A.D. 1774-75).
729th	Sufur, Teesa Subain.	1778-79	A share of the Inam village of Darowlee, in the Pour Khora Turuf.	Bhagoojee Balkurdey.	Disobedience of the orders of the Government. सरकार की आज्ञा नमानी Surkara she roozoo nahee.	
817th	Sufur, Teesa Subain.	1778-79	Four Inam villages in Prant Poona.	The minister Sucaram Bhugwunt.	No reason assigned.....	This was the act of the rival Minister Nana Furnavese, the Peshwa being then an infant.

9	Teesa Subain	1778-79	The Inam village of Sawah, in the Mhar Purguna.	Bulwunt Rao Mulhar.	Because his brother had not paid a fine imposed on him by the Government.	This is an entry in the ledger bringing the proceeds of the village to the account of Government, for the reasons assigned in the preceding column.
10	Ditto	1778-79	Land in the village of Murdah, Prant Wace.	Bulle Annajee	For having surreptitiously included in his Inam land that belonging to another person.	This is an entry in the ledger bringing the proceeds of the village to the account of Government, for the reasons assigned in the preceding column.
11	18th Rubee-ool-Awul, Sumaneen.	1779-80	The village of Askhar Khoord, in the Jooneer Prant.	Narayan Joshee, Nurhur Joshee, and Gopal Joshee, the sons of Krishna Joshee.	No reason assigned	And the Sunud, dated four days later, orders the seizure of the whole of the private property, house, &c. of one of the brothers, Gopal Joshee.
12	Ditto	1779-80	Inam land in the Poona and Kuryat Mawul districts.	Ramajee Bugjee, & Dajee Gopal and Balajee Raghoo-nath, Deshpandey's of Prant Poona.	Ditto ditto	A portion of the Wutun also resumed by the same Sunud.
13	3rd Rubee-ool-Akhir, Sumaneen.	1779-80	Three villages in Purguna Neywasee.	Kwajeh Mahomed Khan Kuvce Jung.	Improper conduct. बनगुल यथास्तैत नाहे. Wurtnook yéthasteet nahee.	A Surinjam was resumed at the same time, and both it and the three Inam villages were by the same Sunud transferred to the son of Kwajeh Mahomed Khan on the payment of a relief (Nuzur) of forty-five thousand and one rupees.

Number.	Date of the Registry of the Sun- dud or other Document refer- red to.		Description of resumed Inam.	From whom resumed.	On what account resumed.	Remarks.
	Arabic.	A. D.				
14	Sulas Sumaneen ..	1782-83	Inam land in the Talooka of Luximon Monar. . Viziadroog.		Because his nephew, Ram- chunder Narayen, had join- ed Raghoba.	This is an entry from the led- ger bringing the proceeds of the resumed Inam to account.
15	Ditto	1782-83	The village of Velub, in the Dewjee Oondut Rao. Misconduct. (उत्तर.) Waghera Purguna.			Ditto ditto.
16	22nd Jummad-ool- Awul, Sulas Su- maneen.	1782-83	Fifty-seven Inam villages. Sukobae Sindia, In liquidation of a sum due the aunt of Ma- by the Inamdar to a bank- hadajee Sindia. er.			These villages were subse- quently restored.
17	15th Mohyurum, Sulas Sumaneen.	1782-83	The village of Jambowlee, in Baljoshee Kirkee- Kulhian Prant. ray.			
18	9th Rubee-ool-Ak- hir, Sulas Suma- neen.	1782-83	Three villages, and land in Ram Rao Jewajee seven others. Chitnees, and other of his re- latives.		Ditto ditto	A Surinjam held by them was also resumed by the same Sunud.
19	7th Sufur, Arba Su- las Sumaneen.	1783-84	A large Wutun, extending over twenty-five districts. Deshmook of the province of Dow- latabad, &c.		The adoption without the sanction of Government of a son by the widow of the late Deshmook.	The Deshmook was also Deshpandey, and the latter Wutun was also resumed.
20	2nd Jummad-ool- Awul, Arba Suma-	1783-84	The village of Bunnolee, Ransing Moheetey. Turf Koodall.		1st,— For not producing the Sunud from the Raja of	

neen.				
21 20th Mohurum, Arba Sumanee.	1783-84	The village of Waneegaum, Turuf Rajapoor.	Rugoonath Trim- bukjee Shet.	Sattara, on which the Inam was stated to be held; 2nd, for not paying the shares of the revenue (Umul) of the village belonging to other parties; 3rd, for withholding the Government dues levied from the village officers.
22 Khumus Sumanee.	1784-85	The village of Verasey, Turuf Wunkhul.	Dipajee Rao Ze- roofkur.	For withholding certain monies payable to Government.
23 Eeheday Teesain..	1790-91	Land in the village of Pal, in the Mhar Purguna.	Neelkunt Rao Prul- had Rajapoorkur.	Having obtained the grant of the Inam by false representation to Government, and by forgery.
24 12th Shuwal, Ecsu- ney Teesain.	1791-92	The hamlet of Sheetoley Warree, and shares of the revenue of two villages (Umul).	Nathoojee Shaloon- key.	The death of the holder, and no sanction having been accorded by Government for the continuance to his son.
25 5th Zilkad, Arba Teesain.	1793-94	Share of the revenue (Umul) of several villages in the district of Runasee and Koralee.	Devesing Wiswas- rao Tokey.	Conduct not good. वर्तनूक ठीक नाही Wurtnook teek nahee.
				This is an entry from the ledger in which the revenue of the village is brought to account.
				Ditto ditto.
				A Surinjam also resumed by the same Sunud, and on the same account.
				The same Sunud orders the resumption of a Surinjam, also on the same account, and directs the continuance of both it and the Inams to the son of Devesing.

Number.	Date of the Registry of the Sunud, or other Document referred to.		Description of resumed Inam.	From whom resumed.	On what account resumed.	Remarks.
	Arabic.	A. D.				
26	20th Rubee-ool-Ak-hir, Suba Teesain.	1796-97	The village of Waree, in the Julgaum Purguna.	Resumed at the death of Hajee Taz Khan Rohilay.	The death of the Inamdar.	
27	1st Shaban, Suba Teesain.	1796-97	The village of Takley, Prant Wae.	Mhadoo Rao Narayen Pinglay.	No reason assigned	A Surinjam resumed by the same Sunud.
28	29th Jummad-ool-Awul, Suba Teesain.	1796-97	The village of Mansee, Prant Poona.	Hurbajee Nursew Dhayngoonay.	Ditto	
29	25th Shaban, Teesa Teesain.	1798-99	The village of Seerolee, in the Soopa Purguna, and land in another village in the Baramuttee Kuryat.	Govind Rao Krishna Kalay.	Ditto	A Surinjam also resumed by the same Sunud.

Poona, 2nd May 1853.

(True copy)

(Signed) T. A. Cowper, Captain,
Assistant Inam Commissioner.

(Signed) T. A. Cowper, Captain,
Inam Commissioner Northern Division.

Statement B (to accompany Captain T. A. COWPER, Assistant Inam Commissioner's Letter No. 163, of the 2nd May 1853) of Inams continued to direct and to collateral Heirs, under the authority of the Peshwa's Government, by Sunuds or Orders, which are registered or quoted in forthcoming State Records, Diaries, Ledgers, &c.

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
1	Khumsain	1749-50	Bringing to the account of the Government the sum of fifteen hundred rupees, being the amount of a relief (Nuzur) levied from Kwajeh Hameed Khan on sanctioning the continuance to him of the village of Toorkabad, in the province of Bedur, which had been held in Inam by his father Toork Taz Khan.
2	9th Zilkad, Eeheday Seetain.	1760-61	Sanctioning the continuance, on the payment of a relief (Nuzur) of five thousand rupees, of two Inam villages in territory recently conquered from the Nizam, and then held by the family of Syud Lushkur Khan.
3	16th Shaban, Suba Seetain.	1766-67	Sanctioning, on the payment of a relief (Nuzur) of one thousand rupees, the continuance of a share of the revenue of the village of Kemnair, Turuf Sattara, which had been held in Inam by Appajee Junardhun, and of his Surinjam holdings also, to his brother Balkrishna Junardhun.
4	4th Shuwal, Eeheday Subain.	1770-71	Sanctioning, on payment of a relief (Nuzur), the amount of which was afterwards fixed, the continuance to Morar Rao Jadhaw Bhooinkur of one-third of the Inam village of Bhooinj, Prant Wace, and of the Surinjam also, which had been held by his deceased father Kunderh Rao Jadhaw.
5	20th Shaban, Seet Subain.	1775-76	Sanctioning, on payment of a relief (Nuzur) of five lakhs and one rupees, the continuance to Raghoo-putrao Raja Bahadoor of the Inams and Surinjams held by his deceased father Naro Shunkur Raja Bahadoor.
6	29th Rubee-ool-Awul, Suba Subain.	1776-77	Sanctioning, on payment of a relief (Nuzur) of four thousand and one rupees, the continuance to Hybutrao Athowlay of a share of the revenues

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
			(Umul) of the villages of Sheersophul, in the Soopa Purguna, and of Gozayhvee, in the Baramuttee Kuryat, which had been held in Inam by his deceased father Soobanrao Athowlay, and also of his late father's Surinjam.
7	14th Zillej, Teesa Subain.	1778-79	Sanctioning the continuance to Madhow Rao Pettay of the Surinjams and the Inams which had been held by his late father, the Inams consisting of the villages of Chinchnora, Prant Wace, and Bhamoora, Prant Poona, and of land in the village of Kaeel, Prant Jooneer.
8	16th Rujub, Teesa Subain.	1778-79	Ordering the resumption of the Inams and large Surinjam then held by Raghooputrao Narayen Raja Bahadoor, and transferring them to Trimbuk Rao Narayen Raja Bahadoor (the brother of Raghooputrao) on payment of a relief (Nuzur) of ten lakhs and one rupees.
9	29th Rumzan, Teesa Subain.	1778-79	Sanctioning the continuance to Jeewan Rao Pundit Soomunt of the Surinjam and of half the Inam village of Riswair, in the Kunar district, which had been held by his father Myheeput Rao Pundit Soomunt, deceased.
10	3rd Shuwal, Teesa Subain.	1778-79	Continuing to Huree Pundit Veidhantee the Inam land in three villages of Purguna Indapoor, previously held by his father Govind Pundit, who had proceeded to Benares.
11	29th Rubee-ool-Awul, Teesa Subain.	1778-79	Continuing, on payment of a relief (Nuzur) of twenty thousand and one rupees, to Abdool Gazeekhan, five Inam villages in Purguna Umber, which had been held by his late father, Hakeem Mahomed Aleekhan.
12	6th Jummad-ool-Akhir, Sumancen.	1779-80	Reciting the death, without male issue, of Bapoojee Luximon Poorundhuree, and the consequent resumption of two Inam villages which had been originally granted to his father, and which the Government now allow to be held by Myheeputrao Luximon, the younger brother of the deceased Bapoojee Luximon.

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
13	21st Rubee-ool-Ak-hair, Esunay Sumaneen.	1781-82	Continuing to Megusham Rao the Inam village and lands, and the Surinjam which had been held by his deceased father Nago Rao Megusham.
14	27th Zilhej, Sulas Sumaneen.	1782-83	Continuing to Vireshwar Bhut Kurvey three Inam villages (Madar, Kungola, and Bhadus), and Inam land in the village of Oorsah, which had been held by his deceased brother, and before his death attached by Government.
15	19th Rubee-ool-Awul, Arba Sumaneen.	1783-84	Continuing, on the payment of a relief (Nuzur) of eighteen thousand and one rupees, to Bulwunt Rao Kudum Banday, the Inams (two villages) and Surinjam which had been held by his late father Amroot Rao Kudum Banday.
16	25th Rujub, Khumus Sumaneen.	1784-85	Continuing, on the payment of a relief (Nuzur) of twenty thousand and one rupees, to Narayen Rao Dhumdheray the Inams (one village, and shares of revenue in three others) and Surinjam which had been held by his late father Trimbuk Rao Dhumdheray.
17	8th Rumzan, Teesa Sumaneen.	1788-89	Continuing to Anundrao Mulhar the Inams (shares in the revenue of two villages) and the Surinjam held by his late father Mulhar Rao Krishn.
18	9th Jummad-ool-Awul, Teesain.	1789-90	Sanctioning the continuance of Inam land in the village of Kooshturpun which had been held by Venkun Bhut bin Rajeshwar Bhut, deceased, to his nephew and sons-in-law.
19	20th Rumzan, Teesain.	1789-90	Deciding on a petition from certain relatives and connexions of the Inamdars of the village of Karungulla, in the Moolwar Purguna, and ordering the continuance of the village to the lineal male descendants of the original grantee, and to them alone, and directing the payment of thirty thousand rupees as relief (Nuzur) on the occasion.
20	Teesain	1789-90	Crediting to Government twenty-five thousand rupees, the amount of relief (Nuzur) paid by Rughoonath Rao Myral Pansé, to whom Government had con-

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
			tinued the Inams and Surinjams of his late father and uncle.
21	Echeday Teesain.	1790-91	Bringing to account of Government fifty thousand rupees, the amount of relief (Nuzur) paid by Krishnajeet Thorat, to whom the Inams and Surinjams of his late father Shuvajeet Thorat had been continued.
22	1st Shuwal, Echeday Teesain.	1790-91	Continuing to Jywantrao Marunwar Futteh Jung Bahadoor a share in the Revenue (Umul) of the village of Chincholee, in the Patoda Purguna, which had been held in Inam, and also the Wutun which had been held by his late grandfather.
23	Arba Teesain	1793-94	Bringing to account of Government four thousand rupees, the amount of relief (Nuzur) levied from Sukojeet Rajeh Seerkay, on his being permitted to succeed to his late father's Inams and Surinjams.
24	11th Sufur, Khumus Teesain.	1794-95	Issuing orders for the expenditure of twenty thousand and one rupees, to be levied from Krishna Rao Shaloonkay, as a relief (Nuzur), and on account of other dues, on his being permitted to succeed to his late father's Inam village and Surinjam.

Poona, 2nd May 1853.

(Signed) T. A. COWPER, Captain,
Assistant Inam Commissioner.

(True copy)

(Signed) T. A. COWPER, Captain,
Inam Commissioner Northern Division.

Statement C (to accompany Captain T. A. COWPER, Assistant Inam Commissioner's Letter No. 163, of the 2nd May 1853) of Inams continued to adopted Sons, under the authority of the Peshwa's Government, by Sunuds or Orders, which are registered or quoted in forthcoming State Records, Diaries, Ledgers, &c.

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
1	11th Jummad-ool-Awul, Teesa Subain.	1778-79	Sanctioning the continuance of the Inam village of Dyhurree, Prant Poona, to Mahadeo Rao, the adopted son of Tookajee Somwounshee, and ordering the payment of a relief (Nuzur) of one thousand rupees.
2	26th Rumzan, Teesa Subain.	1778-79	Authorising the continuance, on the payment of a relief (Nuzur) of six thousand rupees, of four villages which had been held in Inam by Syud Kootubdeen Mahomed Khan wulud Syud Noor-dee Mahomed Khan Bahadoor, and resumed on his death without male issue, to his adopted son Imamooddeen.
3	9th Rubee-ool-Awul Teesa Subain.	1778-79	Sanctioning the continuance of Inam land in the village of War, in the Asseer Purguna, to Kassee Dut, the adopted son of Myheshwar bin Rameshwar Jance.
4	16th Sufur, Esunay Sumaneen.	1781-82	Reciting the previous resumption of the village of UMBER Khoord, in the Purguna of Nassick, in consequence of the death, without male issue, of the Inamdar Ramchunder Bhut Khairkur, and the adoption of a son by his widow, not having received the sanction of Government, and now according such sanction on the application of the adopted son himself (Moro Bhut), and allowing him to hold the village.
5	2nd Sufur, Arba Sumaneen.	1783-84	Sanctioning the continuance of three Inam villages in the Sattara district to Suddasew Pundit, the adopted son of Goonakur Pundit.
6	Arba Sumaneen	1783-84	Bringing to the account of Government twenty thousand rupees on account of a relief (Nuzur),

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
			or of a portion of a relief, paid on the Government according sanction to the continuance of the Inam village and land which had been held by the late Anundrao Ram to Ram Rao Anunt, adopted by the widow of the deceased Inamdar.
7	27th Zilhej, Seet Sumaneen.	1785-86	Sanctioning the continuance of the Inam village of Velloo, Prant Waec, which had been held by Burhanjee Mohitay, deceased, to Soajee Mohitay, adopted by the widow of the late Inamdar.
8	Teesa Sumaneen..	1788-89	Bringing to Government account eighty thousand and one rupees, the amount of relief (Nuzur) levied on the recognition by Government of Rung Rao as the adopted son of Myheeputrao Luximon Poorundhuree, and on allowing him to succeed to the Inams and Surinjam held by his deceased adoptive father.
9	9th Rubee-ool-Ak-hir, Teesa Sumaneen.	1788-89	Acknowledging the receipt by Government of fifty-five thousand rupees, the amount of relief (Nuzur) paid on the continuance of the Inam villages and Wutun of the late Deoshet Veerkur to Mahadshet, adopted by the widow of the deceased Inamdar.
10	10th Rumzan, Teesain.	1789-90	Sanctioning the continuance of Inam lands in three villages, and of the shares of the revenues (Umul) of two others in the Purgunas of Dindoree, Wunn, and Nassick, to Moro Punt, adopted by the widow of the former Inamdar, Mahadowrao Bullal Peteh.
11	7th Mohurum, Teesain.	1789-90	Sanctioning, on payment of a relief (Nuzur) of one thousand rupees, the continuance of Inam land in the village of Malgoond, and of a share of the revenue (Umul) of the village of Nimboree and of other lands, all of which had been held by the late Sudasew Rughoonath Rajwarray, to his adopted son Rughoonath.
12	Teesain	1789-90	Sanctioning, on payment of a relief (Nuzur) of four thousand rupees, the continuance of the Inams and Surinjam which had been held by the late

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
			Deorao Kasseo Mootalik Nyadish, to his adopted son Kasseo Deorao.
13	5th Zilkad, Arba Teesain.	1793-94	Sanctioning an adoption by the widow of the late Appajee Ram Dabholkur, and continuing to the adopted son, Ramrao Appajee, the three Inam villages, exclusive of certain shares of revenue, belonging to other parties, which had been held by Appajee Ram.
14	4th Rubec-ool-Ak-hir, Suba Teesain.	1796-97	Sanctioning the continuance of Inam land in the village of Keshow Rowaché Patun, in Hindoostan, to the widow of Dinnanath bin Purmanund Kirvarce, and authorising her adopting a son to inherit the Inam; also exempting the widow from the payment of any relief (Nuzur) on the occasion.
15	30th Sufur, Suba Myatain.	1806-07	Continuing, on payment of a relief (Nuzur) of twenty lakhs and one rupees, the Inams and large Surinjam held by the late Nursing Khunderao Vinchoorkur, to his adopted son Wittulrao Nursing.

Poona, 2nd May 1853.

(Signed) T. A. COWPER, Captain,
Assistant Inam Commissioner.

(True copy)

(Signed) T. A. COWPER, Captain,
Inam Commissioner Northern Division.

Statement D (to accompany Captain T. A. COWPER, Assistant Inam Commissioner's Letter No. 163, of the 2nd May 1853) of Inams transferred by gift or sale, under the authority of the Peshwa's Government, by Sunuds or Orders, which are quoted or registered in forthcoming State Records, Diaries, Ledgers, &c.

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
1	10th Zilhej, Khumus Seetain.	1764-65	Reciting an application from Moro Gopal to be permitted to hold in Inam the village of Kurrosee, in the Talooka of Chass, which had been transferred to him in gift by the former Inamdar, Krishna Rao Mhadoo Joshee, and ordering the village to be held in Inam accordingly.
2	7th Rumzan, Echeday Subain.	1770-71	Sanctioning the gift in Inam of some land in the Inam village of Chandoorree, in the Nassick Purguna, by the holders of the village, to Bajee Luximon Joshee.
3	21st Rubee-ool-Akhir, Echeday Subain.	1770-71	Authorising a transfer of the Inam village of Rahatonree, in the Kallian Prant, previously made by Rukmabae, the widow of Gopal Mhadoo Goray (who had been granted it on the death of her husband in battle), to Raojee Hurce Bhiday.
4	5th Zilhej, Echeday Subain.	1770-71	Sanctioning the transfer of 3 beegas of Inam land in the village of Sap, in the Bhewndy Prant, which had been given by Survootum Shunkur Phurkay to Rambhut bin Govind Bhut Phatuk.
5	20th Zilhej, Echeday Subain.	1770-71	Sanctioning the transfer of a share of the revenue (Umul) of the town of Halgaum, in the Sewgaum Purguna, which had been held in Inam by Su-koobae Sinday, and made over by her to Kundeh Rao Naique Nimbalkur.
6	24th Rujub, Esunay Subain.	1771-72	Sanctioning the transfer of Inam land in the town of Kullian, in the Kullian Prant, which had been held by Ramchunder Krishnarao Joshee, and given by him to Gungadhur Moreshwur Golay.

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
7	11th Rubee-ool-Awul, Sula Subain.	1772-73	Sanctioning the transfer of a share of the revenue (Umuq) of the village of Bendalla, in the Umer Purguna, which had been held in Inam by Sugoonabae Sinday, and given by her to Moro Nurhur Bodray and Vishnoo Nurhur Bodray.
8	4th Zilhaj, Sulas Subain.	1772-73	Sanctioning a transfer similar to the above, but in another village, by the same person to Moro Bapoojee Phurkey, Gungadhur Abajee Phurkey, Hurce Bullal Phurkey, and Dhondoo Bullal Phurkey.
9	9th Jummad-ool-Awul, Arba Subain.	1773-74	Sanctioning the gift of some Inam land in the village of Khanowree, in the Poona Prant, made by Luximon Chintamun Dhurphullay to Mhadoo Rao Krishn Pansy.
10	Arba Subain	1773-74	Bringing to account of Government two hundred rupees, the amount of relief (Nuzur) paid by Myheput Rao Krishna Chandorekur, on his being permitted to purchase, for four hundred rupees, from Luximon Chintamun Dhurphullay, some Inam land in the village of Bhambowra, in the Poona Prant.
11	10th Shuwal, Khumus Subain.	1774-75	Sanctioning a gift in Inam made to Anundbhut bin Dhondbhut Chitrao and to Kasseebhut bin Dhondbhut Chitrao, by Withul Sewdeo Vinchorekur, of some Inam land in his Inam village of Saikhair, in the Nassick Purguna.
12	12th Rujub, Suba Subain.	1776-77	Sanctioning the gift of some Inam land in the village of Bhooinj, made by Bulwunt Bajee Rao to Venkajee Mankeshwur Usalaykur.
13	5th Jummad-ool-Awul, Suman Subain.	1777-78	Sanctioning the gift in Inam, by Tookajee bin Suntojee Somwounshee, of some land in his Inam village of Dyhurree, in the Mawul Turuf, to Myheput Rao Krishna Sathay.
14	9th Shaban, Sect Sumaneeen.	1785-86	Sanctioning the gift by Balajee Junardhun (Nana Furnavese) of some Inam land in the town of Waee, to Rajeshwarbhut bin Konherbhut Nanderkur.

Number.	Date of the Registry of the Sunud or other Document referred to.		Substance of the Sunud, as registered or quoted in the State Records.
	Arabic.	A. D.	
15	1st Rubee-ool-Awul, Suba Sumaneen.	1786-87	Sanctioning the sale by Daood Khan and Hyder Khan of their Inam village of Khoomshet, in the Jooneer Prant, to Balajee Mhadoo Bhirray, for the sum of rupees fifteen thousand and one.
16	8th Shuwal, Esunay Teesain.	1791-92	Sanctioning the gift by Balajee Junardhun (Nana Furnavese) of some Inam land in the village of Kurrundee, in the Tarneer Purguna, to Suznajee bin Yessajee Goorow Waghmarah.
17	8th Shuwal, Sulas Teesain.	1792-93	Sanctioning the gift by Eshwunt Gungadhur Chunderchoor, of his Inam village of Hewrah Choundal, in the Umber Purguna, to Abbajee Gungadhur Wanowlay.
18	2nd Rumzan, Sulas Teesain.	1792-93	Sanctioning the sale by Mahomed Hoosein-ood-deen wulud Shaik Meerao-ood-deen and others, for the sum of rupees one thousand seven hundred and one, of Inam land in the town of Akoleh, in the Akoleh Purguna, to Krishnajee Ambadas Sunt.

(Signed) T. A. COWPER, Captain,
Assistant Inam Commissioner.

Poona, 2nd May 1853.

(True copy)
(Signed) T. A. COWPER, Captain,
Inam Commissioner Northern Division.

No. 62 of 1855.

TERRITORIAL DEPARTMENT, REVENUE.

To the HONORABLE THE COURT OF DIRECTORS,

For Affairs of the Honorable East India Company, London.

Dated Bombay, 9th July 1855.

HONORABLE SIRs,—We do ourselves the honour to forward herewith copy of a Memorandum which, at the request of our Officiating Chief Secretary, Captain Cowper, Inam Commissioner Northern Division, has prepared, explanatory of the practice as regards admitting adoptions to Inams followed in this Presidency.

2. Your Honorable Court, acting on the opinion of the Government of India, have directed (revenue despatch No. 5, dated 23rd March 1853, paragraph 3) that there should be “no alteration in the existing practice in this respect,” being evidently impressed with the opinion that the practice has been to admit of adoptions to Inam estates without exacting the consent of Government to such adoption.

3. Captain Cowper, it will be perceived; has, in his very complete and able Memorandum, fully shown that, from the introduction of the British Government in 1817, until 1825, no adoption to an Inam was allowed without the previous consent of Government. In 1825 an ambiguous order was issued, directing that “children adopted with such forms and sanctions as have been usual should succeed to Inams or whatever may be considered private property.” This order produced much irregularity in practice, but subsequent to 1836 it would appear that the consent of Government has always been considered essential.

4. The practice of the Peshwa's Government has been illustrated by Captain Cowper by many examples, placing beyond all doubt that the consent of Government to adoptions was, during the supremacy of the Murathas, rigidly insisted on in all cases of adoption (and often in cases of regular lineal succession), and generally, if allowed, purchased by the payment of a considerable Nuzur.

5. In forwarding a copy of Captain Cowper's Memorandum, we beg to inform you that we consider the “existing practice,” which your Honorable Court have enjoined us to follow, to involve the necessity of obtaining the consent of Government to *all* adoptions of heirs to alienated State revenues.

We have the honour to be, &c.

(Signed) ELPHINSTONE.

„ J. G. LUMSDEN.

„ A. MALET.

Bombay Castle, 9th July 1855.

Extract Paragraphs 3 and 4 of a Despatch from the Honorable the Court of Directors, No. 3, dated 12th March 1856.

Letter dated 9th July, No. 62 of 1855.

3. The information brought together in the valuable Memorandum prepared by Captain Cowper conclusively establishes that under the government of the Peshwas the consent of the ruling power was invariably required for the adoption of heirs to all rent-free holdings, as well as for the alienation of such holdings from the line of the original grantee; that the same practice was maintained by the British Government from 1817 to 1825, in which year an order in regard to adoptions was issued so ambiguously expressed as to lead to much doubt and uncertainty, and to introduce a want of uniformity in disposing of such questions; and that from about the year 1836 the original principle of requiring the consent of Government to such adoptions was revived, and has since that time been steadily adhered to.

Forwarding a Memo. by Captain Cowper, Inam Commissioner in the Northern Division, explanatory of the practice as regards admitting adoptions to Inams.

4. Under these circumstances, we approve the interpretation which you have put on our orders to follow the existing practice in this respect, (despatch dated 23rd March, No. 5 of 1853) as "involving the necessity of obtaining the consent of Government to all adoptions of heirs to alienated State revenues."

No. 59 of 1856.

REVENUE DEPARTMENT.

From Captain T. A. COWPER,
Officiating Special Commissioner,

• To H. YOUNG, Esq.,
Officiating Chief Secretary to Government, Bombay.

Dated Bombay, 5th May 1856.

SIR,—In paragraph 24 of my Memorandum No. 569 A, dated the 26th May 1855, I stated that the sanction of Government to all adoptions, in virtue of which property held from the State was sought to be inherited, had always been considered essential during the Peshwa's rule, and that the same practice had been followed under the British Government until May 1825, when a directly contrary principle appeared, to use the

words of the late Inam Commissioner, Mr. Hart, to have been first enunciated "by Captain Robertson (who was mistaken in the supposed facts on which he grounded it); to have been submitted without more investigation than he could have made in *one day* by Mr. Chaplin; and to have been immediately adopted by Government," without, in so far as the records show, any further inquiry.

2. In the same Memorandum I showed that there were reasons for believing the order passed by Government on that occasion to have been "either issued under some complete mistake or misapprehension, or that in describing the necessity of 'such form and sanctions as may have been usual,' the sanction of the ruling power was understood to be included as a matter of course"; and I further showed that Mr. Chaplin could not in all probability ever have construed the Government order in any other way.

3. I have within the last few days become cognisant of that which places it beyond the possibility of doubt that Captain Robertson's letter, on which the Government order of 1825 was issued, either was intended to convey an opinion precisely the reverse of that which it has hitherto been supposed, and certainly does appear to uphold, or else that it conveyed one now shown to be perfectly worthless, not merely on the evidence of former universal practice, but equally so on that afforded by his own emphatic contradiction of it, recorded six years afterwards.

4. In 1831 Government were requested to recognise an adoption of a son to succeed to certain Inam, Surinjam, and other holdings of the late Jywuntrao Muntree. The question was referred for the opinion of several Collectors, of whom Captain Robertson, then Collector of Ahmednuggur, was one. His reply (No. 354, dated 24th August 1831, paragraph 2) to the Government reference is below transcribed:—

"My opinion is, that to enable the Hindoo son to inherit the possession of his adoptive father, in any country or jurisdiction of India, the sanction of the Government of that country to the act of adoption is required by the Hindoo law as a *sine quâ non* of legal title; and as we also dispense justice to Hindoos by their own laws, the adopted son of the Muntree has, therefore, no title to the succession unless Government be pleased as a favour to acknowledge and admit it."

5. I have also to bring to the notice of Government an extraordinary illustration of the want of system and the error which have prevailed in the disposal of applications to be permitted to adopt.

6. On the 4th October 1831, the following Minute was recorded in the Political Department by the Governor, the Earl of Clare. How or in what this Minute had its origin cannot be ascertained. It is recorded

in a miscellaneous political volume, written on a small piece of letter paper, and has no apparent connection with any of the proceedings with which it is bound up:—

“ From several papers which have lately come before me, it appears that the Collectors do not exactly know in what cases Government allows adoptions, and misconception on this subject has, I believe, arisen from the late dissensions respecting Nuzurana; and to remove all doubt I think that the instructions of Government dated June 3rd 1825 should be republished for the information of the Collectors and all concerned.”

7. Consequent on the above Minute, the following circular instructions were under date the 24th October 1831 issued in each of the departments :—

“ It having come to the knowledge of Government that some doubt exists as to the particular cases in which adoptions are allowed, I am directed by the Right Honorable the Governor in Council to communicate to you the following instructions for your guidance.

“ 2. As a general rule in the Deccan, Government admits that children adopted with such forms and sanctions as may have been usual should succeed to Inam lands, or whatever may be considered private property.

“ 3. With regard to Jagheer, no adoption can have any effect unless it is expressly so declared by the Government.”

8. Fifteen days later, on the 8th November 1831, Government, in their Revenue Secretary's letter No. 3647, informed the Collector of Ahmednuggur that an adoption of a son by a widow who then held in Inam the village of Amburkhood, in the Nassick Purgana, “ may be permitted, under a clear understanding that it is not to confer any title to the village alluded to.”

I have the honour to be, &c.

(Signed) T. A. COWPER, Captain,
Officiating Special Commissioner.

NO. 1787 OF 1856.

TERRITORIAL DEPARTMENT, REVENUE.

TO THE OFFICIATING SPECIAL COMMISSIONER.

Copy of the Resolution passed by Government under date 23rd May 1856, on a Letter from the Officiating Special Commissioner, No. 59, dated 5th May 1856, bringing to notice certain circumstances connected with the Orders formerly issued by Government, and the practice observed regarding Adoptions affecting the Public Revenue.

These further researches completely corroborate the opinion already arrived at by Captain Cowper, and concurred in by Government and the Honorable Court, to whom copy of this communication should be forwarded.

(Signed) H. YOUNG,
Officiating Chief Secretary to Government.

**SELECTIONS FROM THE RECORDS OF THE BOMBAY
GOVERNMENT.**

No. ~~XXIII~~ NEW SERIES.

CORRESPONDENCE

REGARDING THE

**CONCEALMENT BY THE HEREDITARY OFFICERS
AND OTHERS**

OF THE

Revenue Records of the Former Government,

AND THE

REMEDIAL MEASURES IN PROGRESS.

. B o m b a y :

PRINTED FOR GOVERNMENT

AT THE

BOMBAY EDUCATION SOCIETY'S PRESS.

1856.

CONTENTS.

	PAGES
Letter from the Assistant Inam Commissioner, mentioning a glaring case of withholding of accounts of the revenue management of the former Government	1 — 20
Resolution of Government thereon	20 — 22
Government letter, requiring the Inam Commissioner to submit a report on the general subject	22
Inam Commissioner's Report	23 — 48
Minute by the Right Honorable the Governor, subscribed by the Civil Members of Government	48 — 50
Further Minute by the Right Honorable the Governor	50, 51
Ditto ditto by the Honorable Mr. Lumsden	51
Orders of the Honorable the Court of Directors	51, 52
Government to the Legal Remembrancer, directing the preparation of a Draft Act	52
Reply from Legal Remembrancer, forwarding Draft Act	52, 53
Draft Act	53 — 55
Despatch from the Government of Bombay to the Honorable Court of Directors.....	55, 56

REVENUE RECORDS OF THE PESHWA'S GOVERNMENT.

No. 163 OF 1854.

From Captain T. A. COWPER,
Assistant Inam Commissioner,

To C. J. MANSON, Esq.,
Inam Commissioner.

Dated at Deoghur, Poona Districts, 25th March 1854.

SIR,—I have the honour, under the instructions noted in the margin, to

Government order in the
Political Department, No.
3673, of the 18th August
1853, and Inam Commis-
sioner's letter No. 2415, of
the 22nd idem, the accom-
paniments to which are
herewith returned.

report upon the Surinjam of the Nuggurkur family,
entered as No. 26 of Class II. and No. 21 of Class
III. in the Revised Lists of Surinjams submitted to
Government by the Agent for Sirdars, Mr. Brown, on
the 26th October 1847.

2. The entry regarding this Surinjam in the
memorandum prepared by Mr. Elphinstone's Secretary, Mr. McDonnell, is
below extracted :—

" No. 38. Ramchunder Mahadeo Nuggurkur Exd.

" Ahmednuggur.

Kusba Kanoor, Purguna Parnair Rs. 8,400

" Hyderabad.

1 chahoor of land in Moujé Soorégaum, Purguna Gandapoor .. 195

" Poona.

3½ khundies of land in Moujé Kotroor, Turuf Kuryat Mawul.. 100

Grand Total Jagheer.... Rs. 8,695

"INAM.

"Ahmednuggur.

100 beegas of land in Kusba Kanoor, Purguna Parnair ..	Rs.	150	0	0
In the Turuf Nuggur Havélly.....		119	0	0
		<hr/>		
Total in Ahmednuggur....	Rs.	340	0	0

"Konkun.

Land in Moujé Ambarry, Turuf Pavus, Talooka Rutha- gherry.	Rs.	274	4	0
		<hr/>		
Grand Total Inam....	Rs.	614	4	0

"38. This man has not given in any statement ; he is in confinement with Robertson as a revenue defaulter. You give a very bad character of him in your notes. The nephew has returned from Benares and claims his share. Bajec Rao's last Sunud is in Ramchunder Mahadeo's name, in consequence of which it is said Captain Pottinger has continued it to him. The nephews, Neelkunt Rao Yeshwunt and Narayen Rao Yeshwunt, state that they left Benares in consequence of hearing that their share was restored to them ; what they had collected on their account prior to Captain Pottinger's last order they are now called on to refund by Ramchunder Mahadeo. By the district accounts the collections in 1226 from Kanoor amounted to Rs. 5,910-12½. Bajee Rao's last Sunud is dated ten years ago."

3. In the lists of Surinjams proposed to be continued, which Mr. Elphinstone subsequently forwarded to the Government of India on the 25th October 1819, this holding was entered as No. 35 in the Class of Mootsudees (A), as shown below :—

Number.	Name.	Class.	Remarks.	Decision.	Total Amount of the Jagheer as it stood at the breaking out of the War.	Number of Years in possession.	Jagheer, or Yearly Allowance to be continued.			For what period recommended.
							Kumal, or greatest recorded Collection.	Estimated real Value at present.	Pecuniary Pension.	
35	Ranchunder Mahadeo.	A	A man of a very respectable family. He was a great Mamlutdar in Bajee Rao's time, & acquired his favour by disreputable acts. He promised to give up several forts, broke his faith, and is now in prison at Waece. His nephew, who is at Benares, has a claim to these lands. A good deal of his property was plundered at Singhur. He is a revenue defaulter.	The Jagheer to be divided according to the legal shares, as it would have been had Bajee Rao's last Sunud never been issued, between him and his nephew.	Rs. a. 8,695 0	41	Rs. a. 8,695 0	Rs. a. 6,205 12½	..	Hereditary.

4. In the register of restored Surinjams which Mr. Elphinstone's successor, Mr. Chaplin, submitted to the Bombay Government on the 28th October 1822, this Surinjam was shown to have been actually restored, in equal shares, to Neelkunt Rao Yeshwunt and Ramchunder Mahadeo ; the entry is below extracted :—

Number.	As per Lists sent to Calcutta.	Amount.			Restored to the under-named individuals, who were the actual Incumbents, and are either the same as those named in the original Lists or their immediate Relations, as explained below.	Amount.			Remarks.
		Kumal.	Akar estimated Value.	Nemnook, or Pecuniary Allowance.		Kumal.	Akar present Produce.	Nemnook, or Pecuniary Allowance.	
35	Ramchunder Mahadeo Nuggurkur.	Rs. a. 8,695 0	Rs. a. 6,205 12½	..	Neelkunt Rao Yeshwunt Nuggurkur, Kumal 4,347-8, Akar 3,566-9¾. Ramchunder Mahadeo Nuggurkur, Kumal 4,347-8, Akar 3,566-0¾.	Rs. a. 8,695 0	Rs. a. 7,132 1½	...	Divided between the brothers.

5. The division of the Surinjam into two parts is shown by a Murathee List, prepared in the Deccan Commissioner's Office, and generally designated the "Jaree Putt," to have been made by Mr. Chaplin, as shown below :—

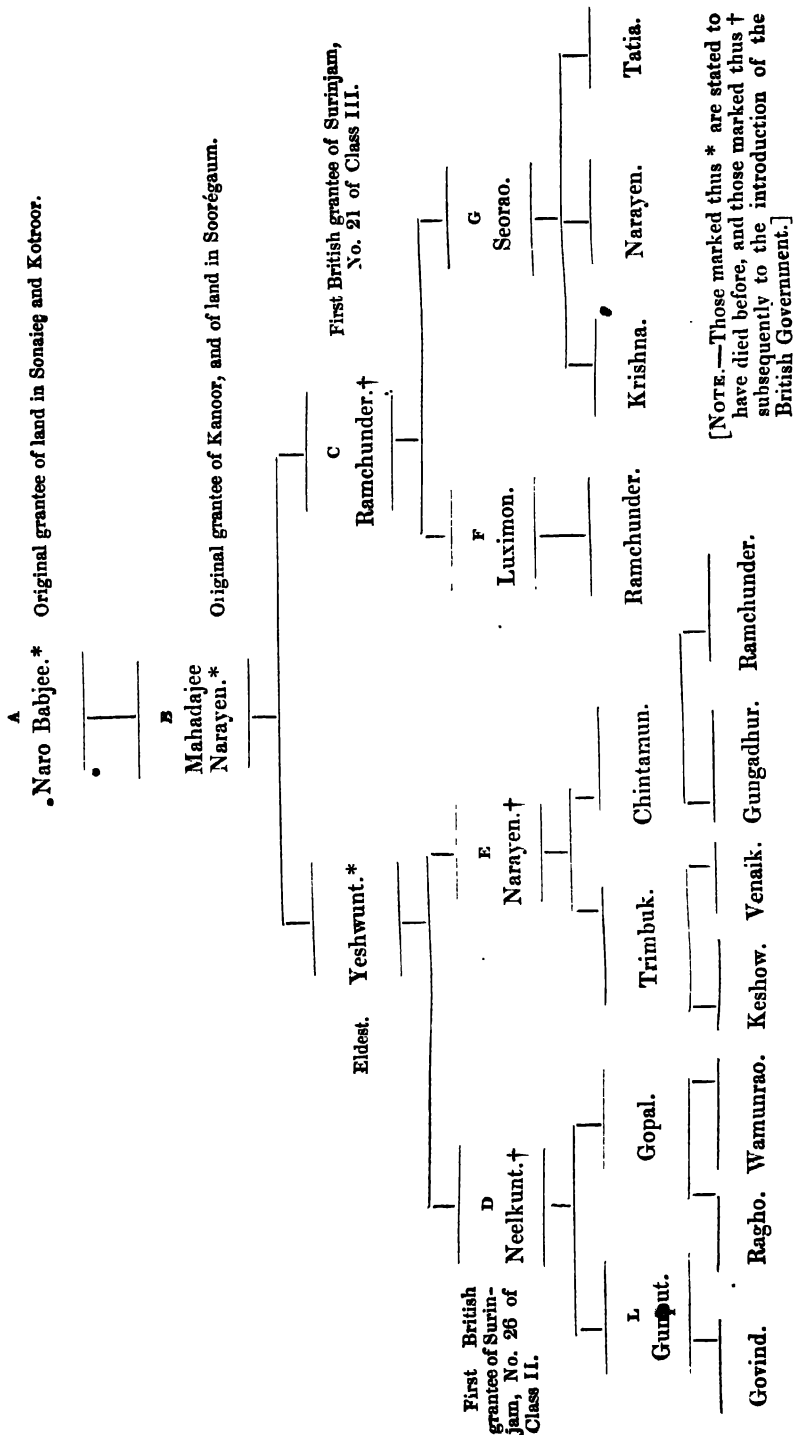
To Neelkunt Rao Yeshwunt Nuggurkur,—

One-half of the revenues of the village of Kanoor, exclusive of the Mokassa, Sahotra, Surdeshmookhee, Surpatelkee, and transit duties	Rs. 4,200 0 0
Half a chahoor of land in the village of Soorégaum, Purguna Gandapoor	97 8 0
One and three-quarters of a khundy of land in the village of Kotroor, Turuf Kuryat Mawul.....	50 0 0
Total	<u>Rs. 4,347 8 0</u>

To Ramchunder Mahadeo Nuggurkur,—

Precisely the same as the above	Rs. 4,347 8 0
---------------------------------------	---------------

6. The following genealogical table has been now furnished by the family.



7. The entry of this holding as No. 28 in the class of "Surinjams granted between the death of Madhow Rao the Great and the execution of the Treaty of Bassein," in the lists dated the 3rd January 1834 prepared by the Deputy Agent for Sirdars, Mr. J. Warden, is below extracted :—

Number.	Names of the Present Incumbents.	Date of Original Grant.	Estimated real Value.	Reasons for making the Grant, as recorded by the Sole Commissioner in the Deccan.	Remarks.
			Rs. q. r.		
28	Neelkunt Rao Yeshwunt, & Luximon Rao Ramchunder Nuggurkur.	A. D. 1779	7,132 0 38	A man of very respectable family. He was a great Mam-lutdar in Bajee Rao's time, and acquired his favour by disreputable acts. He promised to give up several forts, and broke his faith, and is now in prison at Wace. His nephew, who is at Benares, has a claim to these lands. A good deal of his property was plundered at Singhur. He is a revenue defaulter. The Jagheer to be divided according to the legal shares, as it would have been had Bajee Rao's last Sunud never been issued, between him and his nephew.	

8. On the revision shortly afterwards by the Agent, Mr. Marriott, of his Deputy's lists, no alteration was made in regard to this Surinjam, excepting that the number became 35, and the class in which it was entered was described to be that of "ancient Surinjams, granted before or during the reign of the Peshwa called in the Deccan Madhow Rao the Great, or otherwise entitled to equal consideration."

9. In the lists submitted by the Agent, Mr. Mills, on the 23rd October 1840, this Surinjam became No. 38 of Class I., the entry in Mr. Marriott's lists being preserved, with the additional remark,—“The estate was continued to Neelkunt Rao and Luximon Rao before the late Agent's statement was submitted to Government.”

10. In the lists prepared and submitted to Government on the 29th December 1844 by the Agent for Sirdars, Mr. Warden, the half Surinjam, which at the introduction of the British Government had been continued to Neelkunt Rao Yeshwunt, was entered, as shown below, as No. 4 in Class II. of Surinjams “to be held for one generation after the death of the present incumbents.”

Number.	Name of the Original Grantee.	Name of the Present Incumbent.	Soobhas in which the Surinjam is situated.	Names of the Villages comprising the Surinjam.	Estimated Annual Value of each Village.	Date of Original Grant, as ascertained from Sunuds and Records.	Age of the Original Incumbent.	Annual Private Income of the Incumbent.	The Names and Ages of the Incumbent's Legitimate Male Issue.	The Tenure.	Remarks.
	Mahadajee Narayan Nuggurkur.	Neelkunt Rao Yeshwant Nuggurkur.	Poona	Land in the village Kotroor.	Rs. a. p. 50 0 0	A. D. 1779	54 years.	410 0 0	Gunput Rao, 21 years; & Gopal Rao 16 years.	The Surinjam to be continued to the next generation, and a pension equal to half the net proceeds to be given to the generation next succeeding.	
			Ahmednuggur..	Half of Kanhoor	4,099 13 0						
				Total..	4,149 13 0						

11. The other half of the Surinjam, which at the introduction of the British Government had been continued to Ramchunder Mahadeo, was entered in the lists of 1844, as shown below, as No. 3 in Class III. of Surinjams "to be resumed on the death of the present incumbents" :—

Number.	Name of the Original Grantee.	Name of the Present Incumbent.	Soobhas in which the Surinjam is situated.	Names of the Villages comprising the Surinjam.	Estimated Annual Value of each Village.	Date of Original Grant, as ascertained from Sunuds and Records.	Age of the Present Incumbent.	Annual Private Income of the Incumbent.	The Names and Ages of the Incumbent's Legitimate Male Issue.	For life, and the amount of half the net proceeds to the heir as pension.	Remarks.
3	Mahadejee Narayan Neggurkur.	Seorao Ramchunder, and Luximen Rao Ramchunder.	Poona.....	Land in the village of Kotroor.	Rs. a. p. 50 0 0	A. D. 1779	37 years.	Rs. a. p. 410 0 0	Krishn Rao, 4 years.	For life, and the amount of half the net proceeds to the heir as pension.	See No. 21 of List No. 5.
			Ahmednuggur..	Half of Kanhoor.....	4,099 13 0	....	47 years.	....	Ramchunder Rao, 20 years.		
				Total..	4,149 13 0						

12. In the revised lists submitted by the Agent for Sirdars, Mr. Brown, on the 26th October 1847, the half of the Surinjam, which at the introduction of the British Government was continued to Neelkunt Rao Yeshwunt, was entered, as shown on the two following pages, as No. 26 of Class II.

Number.	Name of Original Grantee.	Name of the Incumbent who was in possession of the Surinjam at the time of the Conquest.	Name of Present Incumbent, and whether the first or second British Grantee.	No. in the List prepared in A. D. 1834.	Soobhas in which the Surinjam is situated.	Names of the Villages comprising the Surinjam.	Estimated Annual Value of each Village, agreeably to the Collector's signed Memoranda.	Date of Original Grant, as ascertained from Sunuds and Records.	Age of the Present Incumbent.	Annual Private Income of the Incumbent.	The Names and Ages of the Incumbent's Legitimate Male Issue.
1	2	3	4	5	6	7	8	9	10	11	12
26	Mahadajee Narayan Nuggurkur.	Neelkunt Rao Yeshwunt Nuggurkur.	Neelkunt Rao Yeshwunt Nuggurkur, first British grantee.	No. 35 of Class I.	Poona Ahmednug- gur. •	Land in the village of Kotroor. Half of Kanhooor. Total..	Rs. a. p. 50 0 0 4,099 13 0 4,149 13 0	A. D. 1779	54 years	Rs. a. p. 410 0 0	Gunput Rao, 21 years; & Gopal Rao, 16 years.

Whether the Surinjam has been continued beyond the Second Generation from the Conquest.	The Tenure.	Reasons for making the Grant, as recorded by Mr. Elphinstone, when Solo Commissioner in the Deccan.	Remarks.
13	14	15	16
No.	The Surinjam to be continued to the second, and the prescribed pension granted to the third, generation.	<p>Class Mootsudees, No. 38. A man of a very respectable family. He was a great Mam-lutdar in Bajec Rao's time, & acquired his favour by disreputable acts. He promised to give up several forts, and broke his faith, and is now in prison at Wacc. His nephew, who is at Benares, has a claim to these lands. A good deal of his property was plundered at Singhur. He is a revenue defaulter. The Jagheer to be divided according to the legal shares, as it would have been had Bajec Rao's last Sunud never been issued, between him and his nephew. Hereditary.</p>	<p>The Chor Chittee (deed of release), dated A. D. 1819, is in the names of Ramchunder Mahadeo and Neelkunt Rao Yeshwunt, as co-sharers of this Surinjam. The name of the former is entered in Mr. Elphinstone's List No. 38, Class Mootsudees. He is dead. His sons' names, Luximon Rao Ramchunder and Seorao Ramchunder, are entered in No. 21 of Class III., and they are consequently the second British grantees. Neelkunt Rao Yeshwunt, whose name is recorded in this list, is the first British grantee. The following detailed circumstances will show the relative co-sharers in this Surinjam :—</p> <div data-bbox="453 779 1027 1155"> <p style="text-align: center;">Mahadajee Narayen, Original Grantee.</p> <pre> graph TD A[Mahadajee Narayen, Original Grantee.] --- B[Yeshwunt Rao Mahadeo.] A --- C[Ramchunder Mahadeo.] B --- D[Neelkunt Rao Yeshwunt.] B --- E[Narayan Rao Yeshwunt.] C --- F[Luximon Rao Ramchunder.] C --- G[Seorao Ramchunder.] E --- H[Trimbuk Rao.] E --- I[Chintamun Rao.] </pre> </div> <ol style="list-style-type: none"> 1. This Surinjam was originally acquired by Mahadajee Narayen, and on the accession of the British power a Chor Chittee for the release of the Surinjam was granted in the names of the co-sharers Ramchunder Mahadeo and Neelkunt Rao Yeshwunt, they being the two surviving senior members of the two branches of the family. Subsequently, on the death of Ramchunder Mahadeo, the Surinjam was resumed, and restored to his two sons Luximon Rao and Seorao by Mr. Chaplin, on the 10th July 1825, whose names are entered in No. 21 of Class III. of these statements. 2. Narayan Rao Yeshwunt died at the time of the conquest, and his two sons Trimbuk Rao and Chintamun Rao being infants, their names were not entered in the Chor Chittee of the Surinjam; but they have enjoyed their respective shares in the Surinjam from the date of the Chor Chittee. 3. Under these circumstances, it would appear that this Surinjam is respectively enjoyed by the whole family, and consequently a moiety of that portion of the Surinjam for which a Chor Chittee was granted to Neelkunt Rao Yeshwunt justly belongs to Trimbuk Rao and Chintamun Rao, the heirs of the deceased brother Narayan Rao Yeshwunt. 4. The date of the original grant of the Surinjam, viz. Sumaneeen (A. D. 1779), is taken from a title-deed in possession of this Surinjamdar, and which is, moreover, registered in the Peshwa's Duffur. 5. This Surinjam has been considered hereditary by Mr. Elphinstone.

13. The other half of the Surinjam, which at the introduction of the British revised lists, as shown below, as No. 21 of Class III :—

Number.	Name of Original Grantee.	Name of the Incumbent who was in possession of the Surinjam at the time of the Conquest.	Name of Present Incumbent, and whether the first or second British Grantee.	No. in the List prepared in A. D. 1834.	Soobhas in which the Surinjam is situated.	Names of the Villages comprising the Surinjam.	Estimated Annual Value of each Village, agreeably to the Collector's signed Memoranda.	Date of Original Grant, as ascertained from Sunuds and Records.	Age of the Present Incumbent.
1	2	3	4	5	6	7	8	9	10
21	Mahadajee Narayen Nuggurkur.	Ramchunder Mahadeo Nuggurkur.	Seorao Ramchunder and Luximon Rao Ramchunder, second British grantees.	No. 35 of Class I.	Poona Ahmednug-gur.	Land in the village of Kotroor. Half of Kanhoor. Total.	Rs. a. p. 50 0 0 4,099 13 0 <u>4,149 13 0</u>	A. D. 1779 ..	37 years. 47 years.

- Government was continued to Ramchunder Mahadeo, was entered in the

Annual Private Income of the Incumbent.	The Names and Ages of the Incumbent's Legitimate Male Issue.	Whether the Surinjam has been continued beyond the Second Generation from the Conquest.	The Tenure.	Reasons for making the Grant, as recorded by Mr. Elphinstone, when Sole Commissioner in the Deccan.	Remarks.
11	12	13	14	15	16
Rs. a. p. 410 0 0	Krishna Rao, 4 years; and Ramchunder Rao, 20 years.	No.	For life, and the amount of half the net proceeds to the heir as pension.	Mootsudees, No. 38. A man of a very respectable family. He was a great Mamlutdar in Bajee Rao's time, and acquired his favor by disreputable acts. He promised to give up several forts, and broke his faith, and is now in prison at Wacc. His nephew, who is at Benares, has a claim to these lands. A good deal of his property was plundered at Singhur. He is a revenue defaulter. The Jagheer to be divided according to the legal shares, as it would have been had Bajee Rao's last Sunud never been issued, between him and his nephew.	The Chor Chittee is in Ramchunder Mahadeo's name, and in it the land in the village of Kotroor, and half of Kanhoor. On his death the Surinjam of Kanhoor was resumed. On the petition of his two sons, the present incumbents, in 1825, Mr. Chaplin directed its restoration; but as the land in the village of Kotroor was not attached on the death of Ramchunder Mahadeo, the same was enjoyed by the present incumbents. The Collector of Poona, however, on account of the land not being included in Mr. Chaplin's order for the restoration of the half of Kanhoor, has resumed this portion of the Surinjam, the restoration of which to the present incumbent should be made, and their names are included in No. 10 of Statement No. 2 of List No. 5. The date of original grant is taken from a record contained in the Poona Duffur, bearing date Sun Summaneen (A. D. 1779).

14. The entry of this Surinjam in the revised lists appears to be faulty in the following instances :—

1st.—The Surinjam is stated to have been “ acquired by Mahadajee Narayen,” whereas the land in Kotroor was acquired (vide paragraph 15 of this letter) by (D) Mahadajee Narayen’s father, (A) Naro Babjee.

2nd.—According to the revised lists, “ on the accession of the British power a Chor Chittee for the release of the Surinjam was granted in the names of the co-sharers, Ramchunder Mahadeo and Neelkunt Rao Yeshwunt” ; but at the conquest (D) Neelkunt Rao Yeshwunt was not a co-sharer, nor was he in possession of any portion whatever of the Surinjam, the *whole* of which had been granted (vide paragraph 16 of this letter) to (C) *Ramchunder Mahadeo* by Bajee Rao in 1810. It was Mr. Elphinstone who annulled the last Peshwa’s act, and issued the order (recorded in the preceding, the 15th, column of the *same* entry in the revised lists) that the Surinjam should be “ divided according to the legal shares, as it would have been had Bajee Rao’s last Sunud never been issued, between him (Ramchunder Mahadeo) and his nephew.”

3rd.—Again, the revised lists state “ Narayen Rao Yeshwunt died at the time of the conquest, and his two sons, Trimbuk Rao and Chintamun Rao, being infants, their names were not entered in the Chor Chittee of the Surinjam.” But this is wholly incorrect, as (E) Narayen Rao died, not at the time of the conquest, but five years afterwards, in 1822 ;* whereas the Surinjam was continued, as directed by Mr. Elphinstone, to Neelkunt Rao Yeshwunt and Ramchunder Mahadeo, and an order of release was issued accordingly, by the Collector of Ahmudnuggur, as early as the 20th April 1818, or four years before Narayen Rao Yeshwunt’s death.

4th.—Having assumed Narayen Rao Yeshwunt’s death to have taken place at the conquest instead of in 1822, it is further stated,—“ Under these circumstances it would appear that this Surinjam is respectively enjoyed by the whole family, and, consequently, a moiety of that portion of the Surinjam for which a Chor Chittee was granted to Neelkunt Rao Yeshwunt justly belongs to Trimbuk Rao and Chintamun Rao, the heirs of the deceased brother Narayen Rao Yeshwunt.” But the circumstances† which the Agent supposed to lead to the above conclusion did not, it has been explained, exist, and these two sons of a younger brother can, apparently, have no claim whatever upon *Government*, although they may have upon the elder branch, so long as the alienation may last.

* Statement of the claimants themselves, made before the Assistant Inam Commissioner on the 18th February 1854.

† The death of Narayen Rao Yeshwunt at the conquest, and the non-entry of his sons’ names in the order of release (Chor Chittee), owing to their being infants.

15. The three items composing this Surinjam were granted as shown below :—

1st.—One chahoor of land in the village of Soorégaum, Purguna Gandapoor, granted to Mahadajee Narayen by a Sunud shown in the Ghurnee ledger to have been registered in the State diary of the 3rd April 1784, (12th Jummad-ool-Awul, Arba Sumanecn,) *in lieu* of a similar quantity of land in the town of Sonaiee, resumed by Government, which had been granted to Naro Babjee exclusive of his salary (Kheriz Tainat), *i. e.* in personal Surinjam, by a Sunud shown in the Ghurnee ledger to have been registered in the State diary of the 31st October 1775 (24th Mohurum, Sect Khumsain).

2nd.—Ninety beegas of land in the village of Kotroor, Turuf Kuryat Ma-wul, valued at Rs. 100, and six maunds of grain, granted to Naro Babjee in gift (Buksheesh), by a Sunud shown in the Bhera ledger to have been registered in the State diary of the 14th November 1756 (20th Sufur, Suba Khumsain).

3rd.—A portion of Kusba Kanoor, consisting of the Jagheer, Babtee, Goorgee, Sheree, Surdeshmooke-kusr, and import duties, and valued at Rs. 8,400, was granted to Mahadajee Narayen as an addition to his salary, (Jastee Tainat), by a Sunud registered in the State diary of the 18th July 1779 (3rd Rujub, Sumanecn). The Sunud specifies the Mokassa, Sahotra, Surdeshmooke, Surpatelkee, transit duties, and half a chahoor of disputed boundary land, as *not* included in the grant to Mahadajee Narayen.

16. The second Sunud, granting Kanoor to Ramchunder Mahadeo, referred to by Mr. Elphinstone, and dated the 1st June 1810 (27th Rubce-ool-Akhir, Ashur Myatain), does not seem to have been registered—at least, no registry has been found; but it cannot be necessary to refer to it, as Mr. Elphinstone specially ignored it when he directed* “the Jagheer to be divided according to the legal shares, as it would have been had Bajee Rao’s last Sunud never been issued, between him (Ramchunder Mahadeo) and his nephew.” It is only of importance to remark that this second Sunud granted neither more nor less than the one issued in 1779 to Mahadajee Narayen (referred to in paragraph 15 of this letter).

17. This Surinjam appears to have been granted (as shown in paragraph 15 of this letter) between A. D. 1751 and A. D. 1796, and to be, under the orders contained in the 12th paragraph of the Honorable Court’s despatch No. 17, of the 26th October 1842, resumable “after a second generation from the conquest, making a pensionary provision equal to half the net proceeds of the Surinjam lands for the generation next succeeding.”

* Column 5 of the extract from Mr. Elphinstone’s lists quoted in paragraph 3 of this letter.

18. As, however, the holding was continued by Mr. Elphinstone in two distinct portions, each of these portions will have to be treated as a separate Surinjam.

19. The Surinjam No. 26 of Class II. has now to be continued to the second generation, the first British grantee, (D) Neelkunt Rao Yeshwunt, having died* on the 26th of July 1853. It should, therefore, be entered in the name of (L) Gunputrao Neelkunt, the eldest son of the late holder. At Gunputrao's death the Surinjam will be resumable, a pension equal to half its net proceeds being granted to the next generation.

20. The other Surinjam, No. 21 of Class III., is at present in the hands of the second generation. It was continued at the introduction of the British Government to (C) Ramchunder Mahadeo, who died in or about 1825, when the Surinjam was, in a letter dated the 12th July 1825, from the Deccan Commissioner, Mr. Chaplin, to the Collector of Ahmednuggur, directed to be "made over" to the two sons of the deceased, (F) Luximon Rao and (G) Seorao, who are at present alive.

21. Government have, apparently, to decide whether Mr. Chaplin's order of the 12th July 1825 was intended to convert the Surinjam continued by Mr. Elphinstone to one person (Ramchunder Mahadeo) into two distinct and separate holdings. It does not seem to me probable that such was Mr. Chaplin's intention; but in any case I apprehend it to have been a measure requiring† the sanction of Government, which does not appear to have been asked for or granted.

22. The Surinjam No. 21 of Class III., if decided to be continuable under the ordinary rules, will lapse at the death of (F) Luximon Ramchunder, the usual pension being granted to the next generation.

23. Should Government decide that (F) Luximon Rao and (G) Seorao are to be considered as having each of them a distinct and separate claim upon Government, it will be necessary, under the instructions received in the 3rd paragraph of the Chief Secretary's letter No. 4532, of the 26th October 1853, to affix a separate number to the half share of each, that of (F) Luximon Ramchunder becoming, in such case, No. 21 A of Class III., and that of (G) Seorao Ramchunder No. 21 B of Class III., and each of the Surinjams thus numbered lapsing on the death of its present holder, with the usual pension to the next generation.

24. It will have been observed that the land in the village of Soorégaum,

* Reported to Government by the Collector of Ahmednuggur on the 13th August 1853, No. 1560.

† Paragraphs 5 and 6 of letter dated the 15th July 1820 from the Supreme to the Bombay Government, a copy of which was forwarded to Mr. Chaplin with a letter No. 1291, of the 23rd August following, from the Chief Secretary at Bombay.

which formed a portion of the Surinjam continued by Mr. Elphinstone, was not entered either in Mr. Warden's lists of 1844 or in the revised lists of 1847 ; this is the portion of the Surinjam which in my letter No. 90, of the 14th February last, I reported to have "been *since* the introduction of the British Government improperly and, apparently, fraudulently entered in the Government accounts as *Inam*." I have passed a decision under Act XI. of 1852 upon the Inam title put forward, and can best explain the circumstances of the case by submitting the following extract from my proceedings No. 115, dated the 24th February 1854 :—

"6. The title-deeds produced by the claimants, assuming them to be genuine and authentic documents, and admitting all that they purport to show, prove that the land claimed was granted not in Inam but in personal Surinjam.

"7. As personal Surinjam it is found entered in the memoranda framed by the Peshwa's Government at different periods, and showing the Surinjam then held by the Nuggurkur family.

"8. As personal Surinjam it was released by Mr. Elphinstone, entered in the memoranda framed by his Secretary, Mr. McDonnell, and included in the lists of Jagheers transmitted by him to the Government of India on the 25th October 1819.

"9. The accounts of the village of Soorégaum have been obtained from the Government records, and the land claimed has been found entered in them as shown below :—

"For 1818-19 and 1819-20 the accounts are not forthcoming.

"In A. D. 1820-21 entered as the Shet-Sunud land of Neelkunt Rao and Ramchunder Mahadeo.

"In A. D. 1821-22 entered as the Shet-Sunud land of Ramchunder Mahadeo, under the head of Inam.

"And from this last year (A. D. 1821-22) up to the present date it has been entered as an Inam.

"10. The claimants are the Koolkurnees of the village of Soorégaum, although the duty is performed by an agent appointed by them. It cannot, however, be argued or supposed that their own holding can have been thus improperly entered for the first time in the accounts of 1821-22, as an Inam, unknown to, or unauthorised by themselves, and they must, apparently, be held responsible.

"11. Under ordinary circumstances the Assistant Inam Commissioner would consider this a case for adjudication under Provision 2 of Rule 6 of Schedule B of Act XI. of 1852 ; but as the holding is one justly claimable as a Surinjam, and as a report on the whole Surinjam of the Nuggurkur family is about to be submitted to Government, the proper present course appears to be merely to direct the entry of the land under its proper head of Surinjam.

“12. The Assistant Inam Commissioner therefore decrees, under Rule 6 of Schedule B of Act. XI. of 1852, that the land claimed be at once entered in the Government accounts as Surinjam.”

25. In closing this report, I have to allude to the valuable accounts of the Peshwa's Government which there was reason to expect would have been obtained from this family. The holder of the Surinjam at the conquest, (c) Ramchunder Mahadeo, was, as recorded (vide paragraph 3 of this letter) by Mr. Elphinstone, “a great Mamlutdar in Bajee Rao's time,” and the founder of the family, (A) Naro Babjee, appears to have had, in one shape or another, jurisdiction over the greater portion of the present Ahmednuggur Collectorate, and to have exercised peculiar functions, very similar to those of this Commission.

26. Not a document, however, of any description have I been able to obtain from any of the members of the family. On the 30th April 1852 I addressed the late (D) Neelkunt Rao Yeshwunt on the subject, and received from him a reply of the same date, informing me that the whole of the records of the Peshwa's Government required by me had been kept in his house at Nuggur, and having been more or less injured and destroyed by vermin and rain, had been sold.

27. On the 30th August 1853 I called upon the other branch of the family, who stated, on the 12th of the following September, their inability to produce a single account of the late Government—all, according to their statement, either having been destroyed at the capture by British troops of the fort of Singhur, or having remained at the introduction of the British Government with the persons who actually managed the various districts for which the Nuggurkur was responsible.

28. That many, if not the whole of the accounts, which in the hands of the Government would be of such value, are still in existence, I have never doubted; and the correctness of my surmise was proved by the discovery of a small portion of them under circumstances showing the existence of a positive traffic in these State records thus concealed and withheld from the Government, and a traffic, too, having for its only support the chance of substantiating by these records claims upon the public revenue. The paragraphs* of my letter reporting the case are below transcribed :—

“I have the honour to report to you the circumstances under which it has come to my knowledge that a very valuable account† of the late Government was lately lent for a consideration of Rs. 15 to Sindia's Vakeel, and produced in evidence before the Mamlutdar of the Kurdeh Talocka, on the

* Paragraphs 1 to 8 of Captain Cowper's Report No. 94, of the 25th February 1853.

† A detailed account of management (Zhurtee) of the Parnair Purguna, for A. D. 1798-99; the Parnair Purguna comprising one hundred and four villages.

occasion of a dispute regarding the boundaries of one of Sindia's villages in the Ahmednuggur Collectorate, Moujé Jamgaum.

"2. I may premise that this account is merely one of an immense number which ought to be, and which doubtless are, in the possession of the family of the Nuggurkur and of their dependents, although they all deny that such is the case.

"3. The Mumlutdar of the Nuggur Talooka lately attached, under orders from me, a number of accounts of the late Government in the possession of the family of the Furnavese of the Nuggurkur, and, in forwarding them, reported on the 25th November 1852 that it had come to his knowledge that a Zhurtee of the Parnair Purguna had been previously furnished by Ramchunder Pandoorung, the Furnavese of the Nuggurkur family, to Sindia's Vakeel, Bapoo Abajee Lélay.

"4. On receipt of this information, I desired Sindia's Vakeel, who was then in Poona, to attend at my office, and I took his deposition regarding the transaction ;—copy and translation of the deposition are annexed to this letter.

"5. The Vakeel, it will be observed, corroborated the report made by the Mamlutdar, whom I consequently desired to make further inquiry, and, if possible, to obtain and forward to me the document: I also desired him to obtain the statements of the parties whom the Vakeel had named as having been the intermediate agents in the transaction.

"6. My instructions were carried out, the Zhurtee was obtained and sent, and so were the depositions of Ramchunder Pandoorung and of the Patel of Jamgaum, Runjee wulud Shayteeba Burway, to the effect that the Patel had obtained from Ramchunder Pandoorung the loan of the Zhurtee on the payment of a sum of Rs. 15, and on further executing a penal bond for *two hundred and fifty rupees*, to be paid in the event of the loss, destruction, or non-return of the Zhurtee to Ramchunder Pandoorung.

"7. Among the accounts of the late Government which are referred to in the 3rd paragraph of this letter as having been found in the possession of the Furnavese of the Nuggurkur family, Ramchunder Pandoorung, and forwarded to me by the Mamlutdar of the Nuggur Talooka, was discovered a catalogue of *other* accounts of the late Government, which must, I believe, have been in the hands of the person from whom those attached by the Mamlutdar, and referred to in my 3rd paragraph, were obtained. I at once desired the Mamlutdar to use every effort to discover them, but he has not yet succeeded in doing so. They are, I doubt not, concealed somewhere or other, and I hope at some future time that I may find them out.

"8. Were these concealed and withheld accounts of the late Government intended to be brought forward in support of claims now being or about

shortly to be inquired into by the Inam Commission, there would be comparatively little to object to, but this is far from being the case: all past experience justifies the belief, and leads inevitably to the inference that they may, and probably will be made the means of re-agitating, at some distant period, claims the *final* settlement of which is, I believe, one of the primary objects of Act XI. of 1852."

29. I have attempted to determine the amount properly payable to Government out of the revenues of Kusba Kanoor, but the inquiry has turned out so difficult and tedious that I have thought it best to set it aside for the present, and to submit at once the required information regarding the continuance of the Surinjam.

I have the honour to be, &c.

(Signed) T. A. COWPER, Captain,
Assistant Inam Commissioner.

Resolution passed by Government under date the 30th April 1855.

RESOLVED,—The Surinjam of the Nuggurkur family was found at the conquest to be entered in the name of Ramchunder Mahadeo Nuggurkur, under a recent Sunud of the Peshwa Bajee Rao.

2. This Sunud the Honorable Mr. Elphinstone specifically ignored, and directed that the Surinjam should be divided in equal shares between the representatives of the two branches of the family, Neelkunt Rao Yeshwunt and Ramchunder Mahadeo.

3. Two Surinjams were, as it were, thus created, which having been originally granted between A. D. 1751 and A. D. 1796, were to be continued to the second generation, with a pension of a moiety of the net proceeds to the third generation after the introduction of the British rule.

4. In the revised lists submitted by Mr. Brown in 1847, several errors are exhibited, which have been clearly pointed out by Captain Cowper. It will only, however, be necessary for Government specifically to allude to those which are material to the present discussion.

5. The Surinjam of Neelkunt Rao Yeshwunt is entered as No. 26 of Class II. in the lists of 1847. Mr. Brown speaks of Narayen, the younger brother of Neelkunt Rao Yeshwunt, having died at the time of the conquest, and of his two sons not being entered as co-sharers in consequence of their infancy. This is erroneous, as Narayen Rao did not die until 1822, and Mr. Elphinstone entered the half Surinjam in the name of Neelkunt Rao only, during the lifetime of his brother. The sons of Narayen Rao have, therefore, no claim upon Government, but only on that member of the family who holds the Surinjam.

6. Neelkunt Rao Yeshwunt died in July 1853. The Surinjam, therefore, is continued, under the Surinjam rules, to his eldest son Gunput Rao Neelkunt, on whose death it will be resumed, and a pension granted to the next generation. The erroneous entry of Mr. Brown should be corrected, and a new one inserted in the lists in the name of Gunput Rao Neelkunt.

7. With reference to the other Surinjam,—that of the half share of Ramchunder Mahadeo in the original Surinjam,—a question has been raised which demands the consideration of Government. Ramchunder Mahadeo died in 1825, and his Surinjam was by the order of Mr. Chaplin, addressed to the Collector of Ahmednuggur, made over to his two sons, Luximon Rao and Seorao. The instructions of Government were neither solicited nor received by Mr. Chaplin on the subject.

8. It will thus be observed that this Surinjam *is in the hands of the second generation*; and the question is whether it shall be resumed on the death of Luximon Rao, or whether it shall be regarded again as two Surinjams, on account of the sub-division made under Mr. Chaplin's orders, and each resumed on the death of its respective holder.

9. It may be conceded that Mr. Chaplin was too hasty in giving the Surinjam to both the sons, but the Right Honorable the Governor in Council is not disposed after the lapse of thirty years to disturb the arrangement. He therefore considers that each holding should be regarded as a separate Surinjam, each resumable on the death of its present incumbent, with a pension to the eldest son of Luximon Rao equal to half of the ascertained net value of his share, and a similar pension to the eldest son of Seorao. The Right Honorable the Governor in Council directs that the lists may be amended accordingly.

10. The lists both of Mr. Warden and Mr. Brown omit from the Surinjam the land in the village of Soorégaum which was a part of the Surinjam continued by Mr. Elphinstone. This omission was caused by the attempt of the holders to pass it off as "Inam." The alteration of title was discovered by Captain Cowper, and the errors in the previous lists should be rectified. No further notice is now required from Government on the subject.

11. Captain Cowper has, lastly, noticed the evasive conduct of the Nuggukur family with respect to public documents suspected to be in their possession. On this subject Captain Cowper may be directed to summon Gunput Rao Neelkunt, the new Surinjamdar, before him, and to point out to him the certainty which exists as to the possession by the family of public records, and the dangerous position in which he will be placed by withholding the property of Government. Captain Cowper may be requested to pursue his inquiries, and to submit a full report to Government on this important subject on their completion.

12. A copy of this Resolution to be forwarded to the Collectors of Ahmednuggur and Poona.

No. 2246 OF 1855.

POLITICAL DEPARTMENT.

To Captain T. A. COWPER,
Inam Commissioner Northern Division.

SIR,—I am directed by the Right Honorable the Governor in Council to acknowledge the receipt of your letter No. 163, dated the 25th March 1854, to the address of Mr. Manson, then Sole Inam Commissioner, reporting upon the Surinjam of the Nuggurkur family, entered as No. 26 of Class II. and No. 21 of Class III. in the revised Surinjam lists of 1847.

2. In reply, I am desired to enclose for your information copy of a Resolution passed by Government under date the 30th April last, and to state that copies have been furnished to the Collectors of Poona and Ahmednuggur, for their guidance.

3. Referring to the concluding part of the extract attached to the 28th paragraph of your letter, in which you express your conviction that certain old records in the possession of this family are intentionally concealed, with the intention of re-agitating, at some distant period, claims the final settlement of which is, it is believed, one of the primary objects of Act XI. of 1852, I am directed by the Right Honorable the Governor in Council to request that you will consider and report whether it be not possible to defeat this intention either by legislative enactment, or by the promulgation of the rules of Government depriving of all weight, in the prosecution of claims, records not produced or given up within a certain date, or which have remained even accidentally in concealment. There can be no finality in decisions, or no protection even against perjuries, if a period be not fixed within which proofs must be adduced and claims prosecuted.

4. I am further desired to request that you will, in communication with the Agent for Sirdars, prepare and submit to Government revised entries, agreeably to the instructions contained in the 9th paragraph of the above Resolution, in respect to the two Surinjams of the Nuggurkur family, for insertion in the Surinjam lists.

I have the honour to be, &c.

(Signed) H. L. ANDERSON,
Secretary to Government.

Bombay Castle, 7th June 1855.

No. 876 OF 1855.

POLITICAL DEPARTMENT.

From Captain T. A. COWPER,
Inam Commissioner Northern Division,
To H. L. ANDERSON, Esq.,
Secretary to Government, Bombay.

Dated at Poona, the 7th August 1855.

SIR,—I have the honour, under the instructions received in paragraph 3 of your letter No. 2246, dated the 7th June 1855, to submit for the consideration of Government, the reasons which appear to render it absolutely necessary that the withholding and concealment of the accounts of the revenue management of the former Government which have prevailed, and which still prevail, throughout the Presidency, should be at length decisively put a stop to; and having afforded this explanation, I will describe the measures by which the object in view may, in my opinion, be attained.

2. The value which Mr. Elphinstone placed upon these accounts, and the great importance which he attached to their acquisition on the conquest of the Peshwa's territories, are described in the portion of his report to the Supreme Government dated the 25th October 1819 below transcribed :—

“In order to guard against fraudulent alienations, as well as to acquire a knowledge of the resources of the country, which, rather than the realization of an immediate revenue, I consider to be our principal business for the first year or two, I took early measures to secure the possession of any information that might have been in the hands of the Native Government. For this purpose I sent for the principal persons of the Peshwa's Duftur from the places to which they had retired, and employed them to collect the records; I afterwards increased the establishment, and put it under the particular direction of Mr. McDonnell, with the assistance of Lieutenant Macleod, of the Bombay Engineers, whose knowledge of the Murathee language peculiarly qualified him for such a task.

“I also called on the Collectors in July 1818 to use every endeavour to secure the accounts of each village for the ten years preceding our occupation of the country. Infinite difficulty was met with in procuring those papers, and it was soon found that little reliance was to be placed on them when procured; the attention of the Collectors is, however, still directed to that object, and the papers they procure will be of great value, from the mutual check between them and the Duftur records.”

3. Three years after Mr. Elphinstone had made the foregoing observations, his successor, Mr. Chaplin, in submitting on the 20th August 1822 a report

on the revenue administration of the conquered territories, thus described the want of accounts of the former revenue management of the country; the inconvenience caused thereby; and the apparent reasons of their not being forthcoming :—

“The impossibility of preserving a strict uniformity of system in the several Collectorates arises from the want of all accurate accounts of the revenue. The district records of former Mamlutdars and Durrukdars have, for the most part, disappeared along with those functionaries, though here and there imperfect fragments are to be met with, exhibiting the revenue of whole villages, but seldom for any continual series of years in succession. The Zemindars ought to have in their keeping lists exhibiting the Zumeen Jhara, or account of the lands of each Moujé, and its assessment; but, in consequence of their long exclusion from employment, very few of them can produce these documents, and never in a perfect shape. The same observation applies to the Koolkurnees, whose records are almost always in the most mutilated state, full of falsification and interpolations, and never so authentic as to be implicitly relied on. The loss of these records is invariably referred to the times of former troubles, which have, indeed, been sufficiently frequent to account for their very general destruction.”

4. It thus appears that the falsification of the revenue accounts was at first well understood to be of general occurrence, but it remains for me to show that this was accompanied by an universal concealment of the old and genuine documents, which have now, thirty-five years later, been discovered by *tens of thousands*, and not unfrequently in a state of perfect order and arrangement.

5. After the first attempt made on the conquest of the country, no further regular effort appears to have been made. Now and then, when some fraud grosser than usual came before the authorities, searching inquiries were made, and concealed accounts discovered. One of these occurrences may fitly be described here, as the measures then adopted on the conviction of the offender afford a very striking contrast to the absence at present of anything like effectual punishment,—the natural consequence of which must be to confirm, instead of eradicate, a state of things under which the hereditary officers have become the chief agents in frauds upon the public revenue, which they are especially, and in very many cases highly paid to check and prevent.

6. The case referred to in the last paragraph is that of an hereditary accountant (Koolkurnee) of the village of Satpoor, in the Nassick Purguna, who having in 1823 fraudulently concealed the old accounts of his village when they were required for the purpose of checking claims preferred upon its revenues, was on detection punished by the confiscation of his Wutun.

7. Hereditary officers lately convicted, not only of the wholesale concealment of public accounts, but also of having previously solemnly deposed to their non-existence, have in many cases found their offence entail upon them no more severe punishment than the loss of a 'couple of months' pay.

8. During the several revenue surveys which have been in progress in the Deccan, reference to the old accounts of revenue management has, of course, been necessary; but the documents produced on these occasions have been, generally speaking, the accounts fabricated at the conquest of the country during the system of falsification described by Mr. Elphinstone, although not unfrequently even these have been superseded by a second series of fabrications.

9. I have now to advert to a matter of the greatest importance, as connected with the enormous alienations of the public revenue in the six Collectorates of Tanna, Rutnagherry, Surat, Kaira, Broach, and Ahmedabad, where all titles to hold land free of assessment must be adjudicated under the provisions of Regulation XVII. of A. D. 1827, which even theoretically is, I am satisfied, very inadequate for the protection of the public revenue, and for the purposes which a careful perusal of all the past correspondence on record has shown me to have been contemplated by its framers. Practically this Regulation becomes utterly inoperative where the genuine accounts of the former Government may be withheld, for it then becomes impossible to test that former enjoyment essential to the recognition of any hereditary right, and the most recent and fraudulent acquisition is placed on precisely the same footing, and becomes just as permanent a charge on the public revenue as the estate held under the oldest and best of titles.

10. The Deccan Commission was abolished in 1826, and during the following eighteen years little was done towards the recovery of improper and fraudulent alienations, and that little has, in the majority of cases, greatly increased the labour and difficulty of the thorough inquiry at length instituted. I have, however, alluded to the proceedings between 1826 and 1843 chiefly to draw attention to the remarkable fact that during their progress the genuine Revenue accounts of the former Government,—to account for the alleged loss of which Mr. Chaplin was so plausibly referred to "the times of former troubles,"—have been produced, almost as a matter of course, *in support* of individual claims, and in the numerous suits affecting alienated land tried in the civil courts.

11. I have hitherto asserted rather than proved the existence of an universally prevailing system under which these public accounts have remained, as to a very great extent they remain still, concealed and withheld from the officers of Government. I now, therefore, proceed to describe the circumstances under which the fact has been brought to light.

12. In 1843 a special Commission was appointed to inquire into the enormous alienations of the public revenue in the Southern Muratha Country, and up to 1850 its operations had been so satisfactory that its extension to the Deccan and Khandeish was determined on; and it was at the same time resolved to place the whole inquiry on a more regular footing; to introduce a system of appeal, corresponding in all material points with that in force in the ordinary courts of law; and to vest each superior officer of the Commission with the powers and functions, in so far as applicable, of a Zilla court of civil jurisdiction.

13. The objects described in the last paragraph were carried out by Act XI. of 1852, previously to the passing of which it had become clear, that without obtaining the old accounts of revenue management nothing could be done towards the adjudication of the immense number of alienations of which no accounts were to be found among the Peshwa's Hoozoor records. This want had begun to be felt, too, in the Southern Muratha Country, where the inquiry had previously been almost altogether confined to alienations regarding which the requisite information was to be found in the *Dufturs* secured by Mr. Elphinstone at the conquest of the country (described in paragraph 2 of this report), and in a few others subsequently obtained by the Collectors and the Inam Commissioner.

14. Towards the end of 1851, public notices were issued throughout the Sholapore Collectorate, calling upon the whole of the hereditary officers and others to surrender to Government the public accounts in their possession. A list was made of the papers thus produced by each person, who was required to declare in writing that he had withheld nothing, and that he was not aware of the existence of any accounts other than those given in by him. All this was done with much labour and at considerable expense, but the result was positively *nil*. Not only were no public accounts produced, but while emphatically denying the existence of any, the hereditary officers did not scruple to produce every single document, *no matter how ancient*, calculated to promote their own personal interests, and to prove their own claims.

15. A similar attempt was a few months later made in the Poona Collectorate, and resulted in similar failure. Indeed, in Poona, matters were so far worse, that in some cases documents purporting to be old Government accounts were given in, but they were forgeries, as the real accounts have since been discovered.

16. That the object of all this fraud and concealment has been well known and thoroughly understood,—that object being neither more nor less than to prevent the recovery of a very large portion of the public funds improperly and fraudulently alienated,—was very clearly, though probably unintentionally, set forth in one of the only two petitions which were presented

to Government against the passing of Act XI. of 1852,—a petition submitted on the 17th of November 1851, in which the following significantly triumphant sentences occur :—

“The records kept by village accountants and district officers are what is required by the Inam Commission, and *are these to be found in the Peshwa's Duftur* ? The Collectorate of Poona only comprises about 1,200 villages, and *let the officer of the Peshwa's Duftur state of how many of these he has the accounts* of the nature required by the Inam Commission.

“Are the records kept by these, as well as by the district officers and village accountants, to be had for the Inam Commission ? *No, certainly not ; they are lost long ago.*”

17. Before passing on, it is proper to explain that the accounts, with the non-possession of which Government was thus taunted, are those of which it has been stated in my 4th paragraph that “tens of thousands” have been subsequently discovered, but of which probably *hundreds* of thousands still remain withheld and concealed, especially in those provinces to which the provisions of Act XI. of 1852 do not apply.

18. As soon as the aforesaid Act became law, the Inam Commissioner in his letter No. 505, dated the 23rd of March 1852, brought to the notice of Government, in the following terms, the necessity of endeavouring to obtain these old accounts :—

“As one of the most necessary proceedings towards giving effect, with any degree of justice, to the provisions of Act XI. of 1852, will be to collect and secure, as soon as possible, the various accounts of a nature to throw light on the history of the alienations of public revenue in the Mahals and villages of the district in which this Commission is appointed, I beg that you will obtain for me (according to the provisions of Rule 1. of Schedule A of the Act above mentioned) the instructions of the Right Honorable the Governor in Council to take possession of such accounts from the Government officers and others in whose hands they now lie, availing myself, in so doing, of the assistance of the revenue authority of each district where the accounts may be lodged.”

19. In reply, the Inam Commissioner was informed, in the Revenue Secretary's letter No. 2001, of the 25th of March 1852,—

“The Right Honorable the Governor in Council approves of your suggestion, and authorises you to take possession, with a view to their better arrangement and security, of the various old accounts required for the operations of the Inam Commission, from the officers and others in whose charge they now are.”

20. I have now succinctly to describe the operations which took place

under the foregoing instructions, and which have demonstrated beyond question the wide-spread existence of a great evil, for the eradication of which decided measures are imperatively called.

21. At Bagulkote, in the Belgaum Collectorate, a complete set of Government records was found concealed by the hereditary officer of the district, who in 1846 had, when called upon to produce all the public records in his custody, furnished the Inam Commissioner with *twenty-nine accounts*, stating in writing that he had no others; yet at the close of 1852 upwards of *eighteen hundred* accounts of the most valuable description were found in this man's possession.

22. The case I am about to describe is a remarkable one, to which I would solicit attention. It is remarkable—*firstly*, that such an enormous mass of records as that discovered should for five-and-thirty years have been successfully withheld from the Government, although placed within a few miles of Poona; and *secondly*, that no effort should have been made to ascertain from Junardhun Narayan Deshpandey, the person from whom at last they were recovered, what had become of the accounts of management of the extensive districts which notoriously were in his hands up to the very end of the rule of the Peshwa, one of whose chief favourites Janoba was.

23. On the 21st of April 1852 the Inam Commissioner, Mr. Hart, issued the following instructions to his Assistant (myself):—

“ I have been informed by the Mahalkuree of Dhonjeh that Janoba [Junardhun Narayan] Deshpandey of Sewapoor, in that Pétā, who was required, with the other Government officers of the district, to attend at his Kutcheree, for the purpose of rendering the Government accounts in his possession, has sent a reply refusing to do so, on the pretence that he is ill in Poona.

“ 2. I am further informed that Janoba is apparently insane, and that persons who have access to his house in Sewapoor are taking this opportunity of making away with the Government records in question.

“ 3. Under these circumstances, I beg that you will be so good as to take measures for at once securing these Government accounts.”

24. On the 24th of April 1852, the result of my proceedings was reported in the following terms:—

“ I have the honour to report having, in compliance with the instructions contained in your letter No. 588, of the 21st instant, taken charge of the Duftur belonging to Junardhun Narayan Deshpandey, a Sirdar of the Third Class, which was at Sewapoor, and also of some hundred bundles of old accounts made over to me in Poona by the Sirdar himself.

“ 2. Junardhun Narayan is, I regret to say, so old and infirm, and his intellect is so shattered, that no definite information can be obtained from him,

though he declares that he has a recollection of a large Duftur belonging to him which ought to be forthcoming. I shall do my utmost to follow up the clue which the Sirdar has given."

25. On the 30th of the following June, I thus reported my further proceedings in the case :—

"On the 24th April last I reported to you having obtained a certain number of accounts of the late Government from Janardhun Narayan Deshpandey, a Sirdar of the Third Class, and I mentioned my belief that a very large number must still remain, which it should be my endeavour to trace and obtain possession of. I have now the satisfaction of informing you that I have been successful, and that I have obtained what must be, I believe, the whole of the Deshpandey's Government records, and which, both in number and the variety of districts to which they refer, may be probably considered as the most valuable Duftur we are likely to find in the possession of any one individual.

"2. On the evening of the day I made the report above quoted I obtained what seemed to me authentic information of the existence of nearly a thousand bundles of accounts of the late Government, said then to be placed in the house of the Deshpandey at Sewapoor, and to have been left (*i. e.* improperly allowed to remain) there by the Government officers, who only three days previously had been sent by me to Sewapoor for the express purpose of obtaining the records said to be still there.

"3. I determined to act at once on this information, and left Poona by dak the same night, reaching Sewapoor at daybreak the next morning. I proceeded at once to the Deshpandey's Wara, told the person in charge of it that I desired to be shown the whole of the Government records said to be placed there, and was immediately taken to the upper story of the building, where I found records of every sort and description, some carefully arranged in bundles, and some lying loose, the whole amounting to, perhaps, a thousand bundles of the usual size (about one cubic foot and a half).

"4. I subsequently discovered that one of the Deshpandey's Karkoons had concealed in his own house a valuable portion of his master's Duftur, which was found *built* up in a cavity of one of the walls of the building. It was fortunate that I obtained this information, for the papers thus discovered seem to consist chiefly of Sunuds, and other authentic documents of a similar nature, which must have been forcibly obtained by Janoba when in the enjoyment of power, there being no less than five tin boxes filled with these documents, which will now of course be applied to their legitimate use, and for the benefit of those to whom they may be found to belong when their claims are tested. •

"5. The whole of the records obtained at Sewapoor have been brought

by me to Poona. It is scarcely necessary to state that as yet it has not been practicable to attempt the examination and assortment of an enormous Duftur of this sort, but a cursory inspection has sufficed to show me that it contains accounts of a very large portion of the Bombay Presidency. The following are the names of the districts, accounts of which have already been found :—

“ 4 Talookas of the Dharwar Collectorate.

6 ditto of the Belgaum ditto.

5 ditto of the Poona ditto.

12 ditto of the Ahmednuggur ditto.

1 ditto of the Sholapore ditto.

7 ditto of the Tanna ditto.

1 ditto of the Rutnagherry ditto.

11 Purgunas of the Khandeish ditto.

3 ditto in Guzerat.

14 ditto in the Sattara districts.

70 ditto in the Nizam's territories.

39 ditto in Hindoostan.

“ And there seems every reason for believing that accounts for nearly every part of the Bombay Presidency will eventually be found,—many of these must, I imagine, like the Sunuds referred to in the last paragraph, have been taken from other parties by Janoba.”

26. On the 31st of March 1852 Mr. Hart ordered me to take possession, with a view to their being stamped and registered as soon as possible, of the old Government accounts in the possession of the hereditary officers of the Poona district; Mr. Hart added,—

“ 2. I am led to wish that your proceeding in this matter may be hastened, from having reason to believe that the Deshpandey has already been attempting to conceal the fact of his possession of Government accounts, and that the Duftur of the Deshmooks, who are themselves absent, and, therefore, unable to look after their own interests, is being tampered with most seriously by the Goomashtas or Karkoons appointed by them to serve Government in their stead.”

27. My proceedings were reported on the 17th of April 1852, in the following letter :—

“ Referring to your letter No. 523, of the 31st March 1852, desiring me to take possession of the Government records in possession of the Mahal Zemindars, I have the honour to state that under the circumstances therein mentioned, to which you drew my attention, and also from information subsequently received by me, I considered an immediate attachment

of the records in question the only method of ensuring their safety. This was accordingly done by means of the Mamledar's establishment, and these papers were at once securely lodged in the Sunwar palace.

“2. The necessity of the precautions you deemed it necessary to inculcate has been amply proved; for in one or two cases attempts were made to evade the attachment, and valuable old accounts were found concealed under grain: that these were thus ineffectually concealed was probably owing to the short time allowed by me to elapse between the order for and the execution of the attachment. I have reason, however, to fear that some Dufturs were previously removed, and have escaped me for the present; I shall spare no effort to trace them.”

28. And on the 23rd of June following further information regarding the hereditary officers' concealed accounts was afforded in the following terms:—

“2. In my letter No. 214, of the 17th April last, I mentioned that I would endeavour to trace the records still evidently withheld by the Poona Zemindars, and this to a limited extent I have succeeded in doing. On the 3rd May following nearly forty Roomals of accounts of the late Government were found in the house of Wamun Ramchunder Deshpandey, concealed in such a manner that without previous information their discovery would have been impossible,—they were buried in an uninhabited and ruinous part of the house, in a built-up staircase, under a heap of rubbish which it took some hours and much labour to remove.”

29. In June 1852 a large and valuable collection of accounts of the extensive holdings under the Peshwa's Government of the Rastia family was made over to the Inam Commission by the then head of the house, Yeshwunt Rao, who, in consideration of his good conduct and the assistance rendered by him on that occasion, has since been rewarded by the Honorable Court of Directors. My object, however, in specially alluding to this case, is to solicit attention to the fact which the Inam Commissioner, Mr. Hart, brought to the notice of Government in paragraph 4 (below transcribed) of his memorandum of the 1st October 1852:—

“4. The Inam Commissioner thinks it necessary to state that the late Balla Saheb Rastia, who was regarded with confidence and favour by Government, repeatedly denied having *any* such accounts as the numerous ones now so readily given in by Yeshwunt Rao, whose conduct in this respect seems deserving of the highest praise.”

30. The foregoing affords, I think, about the best possible illustration of the utter unscrupulousness with which even the highest classes of Natives have lent themselves to frauds of this description. Bulwunt Rao Rastia, the individual referred to by Mr. Hart, was during the thirty years succeeding the

introduction of British rule looked upon, and in very many respects deservedly so, as the first and best of the Deccan Sirdars,—yet in this matter his word was worthless. .

31. How exceedingly vicious has been the system the eradication of which is the object of the present inquiry, was well described by the Inam Commissioner, Mr. Hart, when, in strongly recommending Yeshwunt Rao Rastia to the favourable notice of Government, he observed (paragraph 2 of the Inam Commissioner's letter No. 1957, dated the 18th April 1853),—

“2. It is not for Rastia's sake, but for the sake of Government, that I consider that Yeshwunt Rao ought to be rewarded in some marked manner for the readiness he has shown in producing papers which had been long withheld by others of his family; and though, as stated in paragraph 10 of the Government letter, it is merely an act of honesty in persons possessed of Government records to give them up, they so seldom do give them, they are so seldom detected in withholding them, and they are so much more seldom punished for so doing, that to merely insist theoretically on the truth of what Government has perceived to be the fact will, I fear, be of little service in obtaining the Government accounts still unrecovered.”

32. On the 9th of September 1852 I reported to the Inam Commissioner the result of my proceedings in collecting accounts of the late Government in the south-eastern districts of the Poona Collectorate, in which upwards of *one hundred and fifty persons* had been found in possession of *many thousands* of these documents. Though many were obtained, a much greater number remained concealed. How deliberate was the concealment, and how fearlessly the public accounts withheld from the Government had been habitually brought forward in support of private claims, will be understood from the following report of my proceedings at Soopa, the station of the chief revenue authority of the district:—

“16. At Soopa I had expected to find complete accounts of the Soopa Prant in the possession of Jewajee and Naro Anundrao, by whose family the Mamlut of the Prant was held for sixty years under the late Government; but I am sorry to say that they had removed or concealed the whole, excepting one bundle, which fell into my hands, I believe, from the mere accident of its having been retained as absolutely required to produce in support of a claim then under investigation by the Mahalkuree. This bundle was found to contain accounts of a number of villages of the Soopa Prant for consecutive years, nicely arranged, and evidently a portion of a complete set of accounts of a similar description. I feel quite satisfied that I have been correctly informed regarding the rest of the accounts, and that they are in the possession of the family, though as yet I have not been able

to find them. The son of Naro Anundrao is the Vakeel of the Punt Suchew, into whose territories I suspect that the accounts in question have been removed."

33. In 1852 the family of the hereditary accountant (Deshpandey) of a great number of districts in the Poona and Ahmednuggur Collectorates having become extinct in male lineage, Government were asked to recognise an adoption made by the widows of the last incumbent. It then became necessary to ascertain in how far the duties of the Wutun had been fulfilled, and the result of this inquiry affords so very striking an instance of the practical working of the system, which has been upheld at an enormous drain upon the public revenues, that I quote *in extenso* the following report which I submitted on the 27th September 1852:—

"I have now the honour to report the result of my endeavours to obtain possession of the accounts of the late Government of the Jooneer Deshpandey, the late Krishnarao Amrooteshwar. I have, I regret to say, met with very partial success, for though many accounts have been recovered, those of the greatest value to Government have, I fear, been withheld or concealed. I have delayed this report since my return from Jooneer in June last, hoping to gain further information, but I have not done so, and I must, for the present, relinquish all hope of recovering the missing documents.

"2. It is advisable especially to notice the extent of this Deshpandey Wutun, that a correct idea may be formed of the number and value of the accounts which *ought* to have been forthcoming, but of which I have had great difficulty in recovering even a portion.

"3. The Wutun comprises,* as far as I have been able to ascertain, sixteen Turufs in the Poona, and four in the Ahmednuggur Collectorate, containing altogether no less than six hundred and sixty-four villages. Under the most favourable circumstances, a Wutun of this size must be an unmanageable one, and so the late Deshpandey found it; for though a man of considerable energy, he was obliged to succumb to his Goomashtas (managers), who in many cases succeeded in obtaining power, emoluments, and everything, in short, excepting, unfortunately, responsibility.

"4. Recent occurrences have clearly shown the mischievous working of this system. The widows and relatives of the late Deshpandey came forward full of professions, and expressed themselves most anxious to furnish Government with every account belonging to the Wutun: when, however, I subsequently found Dufturs withheld and concealed in all directions, and

* "Having been unable to obtain accurate information on this point, from either the Revenue Commissioner or Collector, I have shown the extent of the Wutun as stated by the agent of the late Deshpandey's widows, and as found entered in some accounts found in the Deshpandey's house at Jooneer."

remonstrated with them for what I fully believe to have been done partly at their instigation and with their connivance, the excuse with which I was met was the utter impossibility of their checking or controlling the proceedings of the Goomashtas.

“5. I visited Jooneer at the express desire of the widows, and for the especial purpose of securing the Duftur in the Deshpandey's house there. I had been led to believe that I should find complete accounts of the whole of the districts and villages composing the Wutun; instead of which, however, I obtained some two hundred bundles, containing chiefly statements and accounts intended to show the Deshpandey's own personal emoluments. The perfect state of these, and the number of years for which they were forthcoming, at once led me to suspect that Government accounts must have been removed—and so it turned out. I succeeded, with the assistance of the Mamlutdar, in recovering many of them found concealed in all sorts of places, and in the houses of all sorts of people; but I do not suppose that I got hold of a tenth part of the Deshpandey's Duftur in the town of Jooneer alone. I allude to accounts purely the property of Government, such as village Taleebunds, Zumeen Jharas, &c.

“6. On my way to Jooneer I called upon the Goomashta at Kheir for the accounts in his possession, and he, accordingly, produced a Duftur from which every useful paper had been abstracted. Some days afterwards I learned that sixty-four bundles of accounts were built up in a recess in the wall of his house: these I at once obtained through the Mamlutdar, and they will doubtless be of value; but in this case also the information I have received leads to the belief that much Duftur escaped me.

“7. At Chinchoolce there is another Goomashta, and from him I obtained what seemed a tolerably complete Duftur; but his accounts have since been discovered in other quarters, and altogether I cannot venture to believe that many have not been withheld.

“8. That this Wutun can ever be managed properly, and with benefit to the large district which it comprises (a district extending over a great part of two Collectorates), I greatly doubt; indeed everything which has come to my knowledge leads me to believe it an office the continuance of which has ceased to be desirable on any grounds whatsoever.”

34. The Inam Commissioner, Mr. Hart, on the 4th December 1852, submitted the foregoing report to Government, and in doing so observed:—

“2. I beg the especial attention of Government to a letter from my Assistant, Captain Cowper, No. 365, dated 27th September 1852, which shows that the principal duty of the Deshpandey, viz. his keeping accounts

of the villages within his jurisdiction, has been (even if we take the most favourable view of his conduct) entirely neglected.

“3. I beg to express my entire concurrence with Captain Cowper in the doubt and opinion expressed in the last paragraph of his letter.

“4. The real use of Deshpandey's expired with the Mussulman Government; and though our Government has, from motives of excessive tenderness in its treatment of what have been put forward as claims of prescription, permitted the continuance of such Wutuns, it was the policy of the Peshwa to discontinue them whenever the opportunity offered, and this policy was without doubt a sound one. The Government of India has altogether freed itself from the encumbrance of hereditary district officers in the Bengal Presidency.

“5. At all events, now that the useless and ill-managed Wutun of the Jooneer Deshpandey is on the eve of lapsing, I am humbly of opinion that its perpetuation, either wholly or in part, is uncalled for, and would be mischievous.”

35. Government, in consideration of the facts thus brought to their notice, declined, under date the 6th January 1853, to “consent to recognise the adoption to a Wutun the duties of which have been performed to so little purpose, as therein shown.”

36. In September 1852 numbers of accounts of the revenue management of the late Government were found in Poona in the shops of shroffs and snuff-sellers, where they were being gradually used as waste paper, and among these documents were several which *must* have been extracted at some period or other from the Peshwa's State records. This case was brought to the notice of Government on the 11th of September 1852 by the Inam Commissioner, Mr. Hart, who observed :—

“2. I do not think there are sufficient grounds to proceed by criminal information against the shroff in whose possession the Duftur accounts were found, as it cannot be proved that he himself became possessed of them in any actually criminal manner since the introduction of the present Government, and most unfortunately there is no law which denounces as punishable the mere retention by private individuals of those accounts, of which Captain Cowper justly observes—‘Government alone can legitimately claim them; and, what is of more consequence, by Government alone can they be applied to their legitimate use.’

“3. I have considered it my duty to report to Government the facts stated by Captain Cowper, as a reference to them may be of use should Government decide on obtaining a legal enactment providing some means for enforcing the production of all records throughout the Presidency,—a

measure which the experience of every day in this department indicates as more and more requisite."

37. On the 25th of September 1852 I reported to the Inam Commissioner, in the following terms, a most striking instance of the concealment and withholding of the public records of the late Government systematically practised at and since the conquest of the Peshwa's territories, with which a perusal of the records of the Deccan Commission had made me acquainted :—

"2. At the close of 1819 the Commissioner in the Deccan received information which induced him to instruct the Collector of Poona to seize all the Duftur in the possession of the Waug family.*

"3. The Collector immediately sent to Moregaum, in the Poorundhur Talooka, the residence of the Waug family, but succeeded in obtaining, as reported to the Commissioner on the 26th December 1819, only six small bundles of papers.

"4. You will find, on referring to my letter No. 306, of the 9th instant, and to the statement which accompanied it, that at this very place (Moregaum), and from this very family, I obtained no less than *three hundred and thirty* bundles of papers, containing a large number of valuable accounts of the late Government.

"5. It would be difficult, I imagine, to adduce stronger proof of the urgent necessity for some effective measures on the part of Government to obtain what, at this late period, may still remain of property which is undoubtedly that of the State; which has been, and is withheld for no good and legitimate purpose; and the loss of which must result in the rejection of many an honest claim, and the perpetual alienation of a large portion of the revenue of the country to those whose want of all title these records would at once expose."

38. Mr. Hart, in submitting these facts on the 4th of December 1852, No. 1365, for the consideration of Government, stated,—

"3. It is such cases as these which seem to make it desirable that the Inam Commission should be furnished with some more definite and ample authority than it is now possessed of, for the recovery of old records and accounts."

39. On the 25th of October 1852 I became acquainted, from a similar source, with another but a grosser case of the nature described in the last paragraph but one, and which I brought to notice in the following terms.

* During the reign of the last Peshwa, with whom this family was in favour, the management of several districts was entrusted to them, also that of the Peshwa's own private (Khasgee) holdings.

"2. After our occupation of the country in 1817 it became a matter of the utmost importance to obtain correct information regarding the transit, customs, and other duties collected in the Deccan; and for this purpose, inquiries were instituted in every direction, and the Collector of the large districts of Ahmednuggur was, with other functionaries, called upon by the Commissioner to obtain and furnish all the information he could procure regarding the Nuggur Collectorate.

"3. The Collector's report did not afford the requisite information, and he was again addressed on the subject. A copy of his reply to this second requisition is annexed; it is dated the 13th September 1820, and thus accounts for the incompleteness of his previous statements:—

" " I beg leave further to add, that the whole of the accounts connected with this subject were kept at Poona under the Murathas, and that in consequence of this fact there is not a single document from which the roughest guess could be formed of the collections for any one year.

" " If any statements are procurable, I should think it most probable they would be so at Poona, where Chinto Punt Deshmook, the great custom farmer, resides."

"4. There can, I apprehend, be no doubt that endeavours were made to procure accounts from the source pointed out by Captain Pottinger, and there can be as little doubt that previous to the receipt of his letter just referred to, the Commissioner must have made inquiries in the same quarter. In how far the efforts made were successful can be pretty accurately surmised from the fact of Captain Gordon having in March last obtained from the Deshmook family *four cart-loads* of accounts of the late Government, chiefly referring to the customs.

"5. That the revenues of a large portion of this Presidency have suffered greatly from the concealment of the accounts of the late Government heretofore practised is more than probable; but it seems to me *certain* that they will suffer to an incalculably greater extent should these documents not now be recovered and applied to their legitimate use. The Court of Directors and the Government have, I believe, both concurred in the opinion that the decisions of this Commission should be viewed as *final*, and it certainly seems to me that they should be so, from considerations both of policy and justice. If I am correct in these views, it seems very desirable to point out to Government not merely the great risk, but (it may, I think, be safely stated) the positive *certainly*, as matters at present stand, of a large portion of the revenue being permanently alienated to persons possessing no title whatever, and who in many cases have obtained possession by fraud, and have hitherto successfully evaded inquiry by the same means, *i. e.* the concealment of all accounts of the late Government.

"6. The above must be the inevitable result of many of our decisions, unless Government see fit to invest us with power sufficient to ensure the production of *all existing accounts of the late Government*.

"P.S.—Since writing the above, I have learnt that the accounts of the customs received from the Deshmook family at the introduction of the British rule amounted to about *eleven bundles*, which have been up to this day preserved among the old records in the Duftur palace at Poona. The accounts referred to in the 4th paragraph as received from the said family by Captain Gordon, in March last, amount to about *three hundred bundles*."

40. The Inam Commissioner, Mr. Hart, in submitting this report to Government, pointed out that these very accounts, had they not been then concealed, would, in all probability, have afforded the means of reducing the large sums just before paid as compensation to individuals asserted to have been losers by the abolition of transit duties. Mr. Hart said :—

"2. As the recovery from Chinto Punt Deshmook's family of the custom accounts referred to by Captain Cowper was not effected until after the close of the operations of the Claim Commission (lately conducted by Mr. Rose) in the Deccan, and, therefore, not in time to obviate any of the mischief which may have been occasioned by Mr. Chaplin's failure to obtain these accounts, the probable depository of which was pointed out by Sir Henry Pottinger, I should not have considered it necessary to bring Captain Cowper's letter to the notice of Government were it not for the facts pointed out in its 5th and 6th paragraphs as applicable to useful Government records of all descriptions.

"3. As, however, I hope to be soon in a condition to submit some further suggestions on the point indicated in Captain Cowper's 6th paragraph, I think it right to lay at once before Government for their consideration the facts brought forward by Captain Cowper."

41. On the 20th of November 1852 I reported a case in which an immense number of accounts of the Peshwa's Government, the existence of which had been previously denied to the officers of the Inam Commission, were discovered to have been almost immediately afterwards sold by the son of one of the privileged classes to grocers and fire-work makers in the city of Poona, as waste paper. Several *sack-fulls* of these accounts were recovered, but a much larger number turned out to have been destroyed, as no less than two hundred and sixty pounds weight, equal to many thousands of these valuable documents, were found to have been purchased by a grocer for Rs. 24, and to have been used by him in packing up articles sold at his shop. I quote below paragraphs 15 to 17 of the report submitted by me on this occasion :—

"15. As the law at present stands, the concealment and sale of these

records by Mahadeo Rao Gunesh Kanuray does not, I believe, constitute any offence. I have, however, thought it my duty to carefully record my proceedings as above reported, believing it desirable to place the matter in the clearest possible light before Government.

“ 16. I have already on more than one occasion become cognisant of facts tending to prove beyond the possibility of doubt the systematic concealment of accounts of the late Government which has prevailed since our occupation of the country ; and the *hundreds of thousands* of these accounts which I have been able to obtain during the last few months shows the system to be still in full force ; while we now find that their wanton destruction is deemed preferable to rendering them to Government.

“ 17. Withholding or falsification of village accounts of our own Government is severely and summarily punishable by the Regulations,* although the injury in such case can scarcely ever, I believe, amount to more than a temporary loss, either to the State or to individuals. But withholding, concealment, and destruction of similar accounts of the late Government are acts which the law has as yet failed to recognise as criminal, although it is difficult to view them as otherwise, if judged by their results, which are most injurious, involving in the case of the State a *permanent loss of revenue*, and in that of individuals and families a *transfer in perpetuity* of property from the rightful owners to persons without title, many of whom have obtained and kept possession by downright fraud.”

42. On the 1st of November 1852 I reported the result of my endeavours to collect the old records in existence in the three northern districts of the Poona Collectorate, in which I had succeeded in obtaining from nearly *four hundred persons* a great many thousands of valuable documents found in *seventy different villages*. How much, unfortunately, remained to be done, which, owing to the defective state of the law, I could not have attempted with any chance of success, was reported in paragraphs 6 and 7, below transcribed, of my letter to the Inam Commissioner :—

“ 6. In a very large number of cases throughout these districts, the accounts were withheld and concealed, and although I succeeded in obtaining many, I feel satisfied that not one-tenth part has been collected. I will here mention one case—that of the Warreh Deshpandays, from whom I have scarcely been able to obtain a single useful account, although they ought to have, and I doubt not have in their possession thousands ;—they are the hereditary accountants of a district containing nearly *a hundred villages*.

“ 7. This state of things is much to be regretted, and seems to demand early and serious consideration : no remedial measures will, I believe, prove

* “ Regulation XVI. of A. D. 1827, and Act XI. of A. D. 1843.”

* effectual which do not provide a punishment of severity sufficient to deter others from committing the same offence. The law, which at present severely punishes* any person withholding a few hundred rupees from their lawful owner, does not apparently even recognise as an offence the withholding of accounts of the late Government, worth ten times the amount, and yet such documents most surely come under the denomination of property, of which the State must be the lawful owner."

43. On the 6th of December 1852 I submitted a general statement of the revenue accounts of the late Government collected in the city of Poona alone, where upwards of two hundred persons had been found in possession of them, in some cases in enormous numbers. It will convey some idea of the state of things under which the public revenue has suffered, to state that between fifty and sixty thousand valuable public accounts must have been found in this one city. The Inam Commissioner, Mr. Hart, when reporting these circumstances to Government, drew special attention to the evidence afforded by them "of the *universal withholding* of accounts from Government, seeing that notwithstanding the efforts made by the Commissioners in the Deccan who resided on the spot, and by Captain Robertson and successive Collectors of Poona, so many Dufturs should have still remained to be obtained."

44. On the 6th of December 1852 the Inam Commissioner reported to Government the following glaring instances of fraud on the part of hereditary officers :—

"In one small division, a Mahalkuree's Pêta of the Havêlee Talooka in Poona, no less than twenty-four Dufturs, *concealed by Government servants who hold Wutuns for their service*, have been attached in less than one month.

"2. These Wutundars are also shown to have so far abused the influence which their position gives them over the Ryuts within their districts, as to have prevailed on the latter to assist them in their fraudulent withholding and concealment of old accounts and other records."

45. Towards the end of 1852 an exceedingly valuable collection of accounts of the Peshwa's Government was found in the possession of a Sirdar of the Second Class of Privileged Persons, and holding, also, the highly responsible situation of Native Judge (Moonsiff). How very much stringent legislation is required, and how very little is likely, or, indeed, possible to be effected without it, may be correctly inferred from what occurred on this occasion. As observed to Government by the Inam Commissioner, Mr. Hart,—

"It might be legitimately expected, therefore, that in any matter in which

* "Regulation XIV. of A. D. 1827, Chapter VI. Section XI."

the interests of Government were concerned this favoured individual would afford his ready co-operation."

He did, however, nothing of the kind : he had for thirty-five years concealed and withheld public records of a nature specially required by the Government ; he continued to withhold them for many months, in spite of the public notices promulgated by the officers of the Inam Commission ; and when at last they were discovered and attached, he endeavoured to free himself from blame by falsehoods so gross and palpable that Government, on learning the whole of the facts of the case, resolved that he should be debarred from promotion in the Judicial Department (Chief Secretary's letter No. 1233, dated the 19th March 1853). It is evident that it was merely owing to this man's position that Government were able to do anything in the matter,—it was only as a Government servant that he could be punished. It is here that the want of any provision whatever is so severely felt, and this must remain the case until the act of concealing public records, *by whoever committed*, shall become an offence punishable by law.

46. On the 25th February 1853 I reported the discovery of a valuable set of accounts of the former Government in the hands of the Furnavese of the family of Naro Babjee Nuggurkur, who at one time held under the Peshwa, on one tenure or another, the greater portion of the districts now composing the Ahmednuggur Collectorate. I specially brought to notice the fact of the accounts thus withheld from the Government having been openly made the subject of private traffic, one of them having been lent for a hire of Rs. 15 to be produced in evidence in the Collector's department in a dispute regarding the boundaries of one of His Highness Sindia's villages, the Patel of which had obtained this public record on the payment of the sum aforesaid, and on further executing a penal bond for *two hundred rupees*, to be paid by him in the event of its loss, injury, or non-return to the person who ought thirty years previously to have made it over to the officers of the British Government. In closing my report I observed,—

"8. Were these concealed and withheld accounts of the late Government intended to be brought forward in support of claims now being, or about shortly to be inquired into by the Inam Commission, there would be comparatively little to object to ; but this is far from being the case : all past experience justifies the belief, and leads inevitably to the inference that they may, and probably will be made the means of re-agitating, at some distant period, claims the *final* settlement of which is, I believe, one of the primary objects of Act XI. of 1852."

47. Apart from the foregoing considerations, it is doubtless a great public grievance that a comparatively small number of individuals should be allowed

to retain the power, by a grievous abuse of their official position, of forcing the community at large to hire or pay for evidence in their favour afforded by these public records, which they have a legitimate right to obtain free of expense, and which they would be able thus to obtain were the documents in their proper places among the archives of Government.

48. During the past year attempts have been made to obtain possession of the accounts of the former revenue management of the districts composing the large Collectorate of Ahmednuggur, the amount of the alienated revenue in which is excessive, although there is every reason to believe it unusually capable of reduction, could the genuine accounts of the Peshwa's Government be obtained from the persons who now withhold and conceal them. A large number of these documents have been collected, and yet, comparatively speaking, the attempt must be pronounced a failure; for, added to universal concealment, the hereditary officers have now adopted the plan of removing these public records, by cart-loads, below the Ghauts and elsewhere into districts to which the provisions of Act XI. of 1852 do not apply.

49. Not many months have passed since, on receiving good information of the existence of an exceedingly valuable collection of accounts relating to the greater portion of the Peshwa's dominions, and on being further informed that the whole of these accounts were concealed in the Konkun, I applied to one of the Collectors to assist me in their recovery, and was informed by him that he could do nothing of the kind, the law not providing for it. Now as the law applicable to those districts makes no special provision whatsoever for the recovery of public records in the hands of individuals, it follows, as a matter of course, that what occurred with regard to the particular records named by me must affect not only them, but also every account of the previous revenue management of the whole of the Konkun and Guzerat, which may be in the hands of the hereditary officers and others. Indeed, there is no doubt whatever that such is the case; for every report which passes through my hands from these provinces (the Konkun and Guzerat) tends to prove the existence of unauthorised and fraudulent alienations to an enormous extent, while at the same time scarcely a single claim, the admissibility or otherwise of which depends solely on the evidence afforded by the village or other accounts, for the custody of which the hereditary officers are so largely paid, can be tested, as these accounts are never forthcoming. Their existence is denied in the most barefaced manner, and, in so far as I have been able to ascertain, evidence is always given, or,—what amounts to the same thing,—the deficiency of the law obliges the deceived Government officer to act just as if credence was given by him to these assertions, and claim after claim has been recommended for recognition by

Government, the utter groundlessness of which could have been clearly proved by the accounts lying in hundreds in the houses of those whose worthless oral evidence was accepted.

50. I believe the evil which I have been endeavouring to describe to be one affecting the public interests more seriously in the province of Guzerat than in any other portion of the Bombay Presidency. The land alienations alone in the four Collectorates of Guzerat were shown by the Revenue Commissioner, on the 19th May 1848, to amount to nearly *thirty lakhs of rupees*, and to this enormous amount much, I apprehend, remains to be added, coming under the head of political charges. But besides the land alienations, the public revenue is burdened with cash payments to an extent unknown elsewhere. In one Collectorate alone, that of Surat, nearly *one lakh and a half of rupees* are annually paid to the recipients of what are called "Tora Girass" allowances.

51. Collector after Collector, and Revenue Commissioner after Revenue Commissioner, have pointed out the enormity of these Guzerat alienations, and expressed their decided conviction that by a thorough inquiry they could be greatly reduced, there being an unusually large amount of unauthorised and invalid holdings. But it is especially necessary to bear in mind that no such thorough inquiry can take place excepting by means of those revenue records of the former Government which are at present in the hands of the hereditary officers and others, and in whose hands they must remain, unless effectual measures shall be adopted for their recovery.

52. The partial acquisition of these public records in the three Deccan Collectorates has entailed upon the State a considerable expenditure (see paragraph 64 of this letter), incurred for the most part in collecting documents in the hands of persons in the receipt of hereditary stipends, granted to them on the express condition of their keeping in safety, and producing whenever required to do so, the very accounts which they have concealed and withheld. The demoralising effect which the continued and unchecked existence of such a state of things must exercise upon more than one important branch of the public administration is obvious, and will, I doubt not, have great weight with the Government in determining the measures required for the suppression of the evil.

53. Having now endeavoured to afford all the explanation essential to a correct appreciation of existing defects, I will proceed to describe the measures by which these defects may, as it appears to me, be remedied.

54. One of the greatest defects in the law as it at present stands appears to be the absence of any specific provision whatever for searching for concealed public records. Whether this has arisen from oversight cannot now be ascertained. Probably not; however; for it may be, and it seems exceedingly likely, that the framers of the Regulations of A. D. 1827 intended and con-

sidered that public accounts thus fraudulently withheld and concealed—those of former Governments as well as those of the present—should be viewed and treated as stolen property; and it is, I think, greatly to be regretted that this course has not been from the commencement adopted. But however opinions may differ on this point, they must, I imagine, agree as to the necessity of the prompt recovery of these State records by some means or other. In the six Collectorates to which the provisions of Act XI. of 1852 apply, although much has been done, much more remains which is never likely to be effected under the existing law, while in the remaining Collectorates nothing has ever been attempted, although without these accounts any endeavour to reduce the amount of unauthorised and fraudulent alienations, and to place titles on a sure foundation, must, from the causes already described, inevitably result, as has hitherto been the case, in failure.

55. In the Madras Presidency, this important matter is provided for by Section IX. of Regulation IX. of A. D. 1822, under the provisions of which a Collector, on receiving information on oath that revenue accounts have been fraudulently concealed, can issue a search warrant for their discovery.

56. The foregoing, with a little modification, would meet all the requirements of this Presidency. The power vested in the Collector should also be entrusted to the officers conducting an alienation inquiry, and there is one provision in Madras—that at the time of search a full and perfect list of all papers found shall be made out in duplicate on the spot—which, if enforced here, would be tantamount to prohibiting the search altogether. Indeed, unless concealed accounts in Madras are infinitesimally less in number than in Bombay, I am at a loss to understand how the law can be carried out there. But however this may be, it is certain that no lists can be made during or immediately after the discovery of public records, found, not in tens or twenties, but generally in thousands, and sometimes, as in the case of Janoba Deshpandey, reported in paragraph 25 of this letter, in hundreds of thousands. To make a complete list of that Deshpandey's Duftur would have occupied a large establishment of writers for several months; and yet such an unusually valuable collection of public accounts must be the one which of all others it is desirable to obtain.

57. The Madras Code specially provides for the punishment of hereditary officers “knowingly and wilfully falsifying, destroying, or *concealing** public accounts”; the offenders in such cases being liable to “imprisonment for a period not less than one year, nor exceeding five years, and with or without hard labour.”

The facts herein stated suffice, I apprehend, to demonstrate the extreme want in this Presidency of such a Regulation as the foregoing, which, had it

* *Italicised by the Inam Commissioner.*

existed, might have gone far towards preventing the great abuses which have prevailed in it literally almost without a check.*

58. But of all the measures likely to prove effectual, that of holding the emoluments of each hereditary office (Wutun) liable, *as a whole*, to be for ever forfeited, is, I am satisfied, the one which, on grounds alike of expediency and justice, should be adopted. To quote from the report of progress submitted by me two years ago :—

“ 56. At first sight, such confiscation may appear unnecessary ; but I see no other remedy which offers any prospect of success. When it is remembered that these Wutuns follow the Hindoo law of inheritance, and that each share becomes in every succeeding generation smaller and smaller, it seems evident that to deal with such infinitesimal portions of the emoluments would be worse than useless, and would only perpetuate the state of things under which inquiry has hitherto been baffled ; and when it is borne in mind that the express duty for the performance of which these Wutuns were originally granted and are now held is that of keeping and producing the *public* accounts, to withhold these documents for the purpose of defrauding the public revenue becomes an offence for which such confiscation seems a light punishment.”

59. To carry out the measure suggested in the last paragraph, it would suffice to enact that after a certain date, to be declared by proclamation, the discovery of any account of the revenue management of the former Government in the hands of *any* district or village hereditary officer, or the discovery of any such officer having, directly or indirectly, concealed or withheld any such account, should entail the confiscation of the *whole* of the Wutun or other emoluments held from the State.

60. It still remains to provide for the concealment of public accounts by others than the hereditary officers, and for the successful concealment, in spite of all punishment, by the hereditary officers themselves. This is an object of the last importance ; for as I long ago pointed out in the report of progress from which I have already quoted, there is a complete “ certainty that as long as these public records remain withheld from the Government, and in the hands of private individuals, so long can there be no *finality in any decision* passed by this or by any other Commission : as surely as the opportunity will arrive at a future day to bring forward new and to revive invalid claims, so surely will these withheld accounts be produced in support of them ; and as long as they thus remain in existence, so long will they furnish the means of litigation of every description.”

* Such measures as those described in paragraph 7 of this letter can seldom check, and certainly never put a stop to these abuses, to deal with which so leniently is in too many cases to encourage them.

61. Public accounts which, in spite of all endeavours to recover them, may remain concealed and withheld should, I think, be rendered useless for all purposes of vicious litigation and fraud by an enactment declaring all accounts of the revenue management of the former Government produced after a proclaimed date in any court in the Presidency, by any person or persons not acting under authority from or on behalf of the British Government, not receivable in evidence in support of any claim upon, or connected with the public revenue.

62. The acquisition of correct and complete accounts of lapsed Surlinjam and other alienated holdings is equally essential to the protection of the public revenue; as in the absence of these documents not one of the numerous claims to Inams and allowances of various descriptions, which on the lapse of an estate are invariably put forward, can be tested, the alternative being, generally speaking, the permanent alienation of the public funds to persons possessing not the shadow of legitimate claim upon them. Government have already determined (Chief Secretary's letter No. 3421, dated the 4th August 1853) upon making the grant of pensions in these cases dependent upon the honest delivery of all the old accounts, and this is, perhaps, as much as can well be done in the matter. But these orders, to be effectual, and even to be equal in their operation, require to be carried out with invariable strictness. Cases have already occurred in which the warning of Government has been set at nought, and in which not a single account has been obtained where thousands ought to be forthcoming. *One case of this sort in which Government may, on whatever grounds, relax the rule laid down, goes very far to render it altogether inoperative.* Such decisions of Government are carefully watched and made known in all quarters to the parties likely to be affected by them, and these parties regulate their proceedings accordingly.

63. I have now endeavoured to fulfil the instructions of Government, and I trust I have done so completely. I have assuredly not overstated the case; indeed, had space permitted, I could have multiplied instances to almost any extent, and I could have shown the pernicious, though indirect working of the present system in many other respects. I believe the question which Government have now to consider to be one which, from every point of view, demands prompt and decisive action. Even were there nothing else to call for effectual legislation, urgent cause exists in the ruinous litigation, and with it a great amount of forgery and perjury, which the retention of public records in private hands tends directly to encourage.

64. But I must also show how the working of the Inam Commission has affected, and is likely to affect the public revenue, the relief of which from unauthorised and fraudulent alienations must be an important consideration,

though it was not the primary object* with which the Commission was established. Its financial results as regards the Deccan Collectorates, into which it was introduced in 1852, were shown in paragraph 13, below quoted, of my progress report for the year ending 30th April 1854 :—

“ 13. The results afforded by these tables are,—

“ 1st.—That while only Rs. 81,698-9-0 have been altogether expended on account of this portion of the Inam Commission, the recovery of public revenue effected has amounted to Rs. 1,22,913-1-1, thus exceeding the expenditure by one-half.

“ 2nd.—That deducting from the above expenditure Rs. 40,995-4-1 expended in collecting and arranging for use the accounts of the late Government, the recoveries amount to three times the sum expended. [See paragraph 52 of this Memorandum.]

“ 3rd.—That the addition to the *permanent* revenue of the country which either has been made, or will be made at the death of the present, or in a few cases of the next succeeding incumbents, amounts to Rs. 78,698-15-10, or to very nearly the whole sum which this branch of the Commission has hitherto cost.

“ 4th.—That deducting the large amount expended in the collection of the accounts of the late Government, there has been, or will be an addition to the *permanent* revenue of the country of nearly *double* the sum already expended.” (See paragraph 52 of this Memorandum.)

65. It is not, of course, to be expected that the recovery of public revenue can continue to bear this proportion to the expenditure on account of the Commission ; but it is nevertheless, I think, sufficiently clear that were the Commission to work for some years to come without effecting a single additional recovery, it would still have been productive of financial improvement. There is, however, no chance of this occurring, as the number of improper alienations yet to be adjudicated is very great, while in Guzerat their amount is, as I have explained (paragraph 50 of this Memorandum), enormous.

66. It surely can be matter of no surprise that under the circumstances now brought to notice so little should have been done in this Presidency towards the reduction of the excessive alienations of public revenue, with regard to which a modern writer has well observed† :—

“ It is utterly incredible and impossible that so many as now exist were ever permitted at any one time under any one Native Government ; for as such alienations are under Native Governments perfectly arbitrary and dis-

* Declared by the Honorable Court of Directors and the Government to be not so much to recover revenue as to place titles on a sure foundation.

† Campbell's “ Modern India,” page 371.

cretional, there is a constant succession of them, old ones being resumed and new ones granted."

67. I believe the foregoing passage to describe the condition of the alienated revenues of this Presidency with a correctness which could not have been exceeded had every fact on official record been within reach of the writer, who has enunciated an equally sound principle with regard to these alienations in his energetic protest* against the Government being deprived of the power of "inquiring whether they are what they pretend to be or no; why we should have to pay not only our own expenses, but those incurred by Native Governments, for purposes not now required; and especially, why we should let these 'vested rights' mount up to a sum which it is incredible that any Native Government would have permitted."

68. I should fail to present to Government what I believe to be a complete statement of the case, did I omit to place before them my strong and deliberate conviction that it would be far better at once to put a stop to all inquiry whatever, and to recognise every existing alienation, than to continue an investigation while four-fifths of the documentary evidence upon which alone it can be properly based, and in the absence of which no decision can be final, remain in the possession of the persons who, of all others, have the strongest possible personal interest in baffling and impeding it.

69. Should Government agree with me in deeming a legislative enactment required, I would suggest that I should be authorised to communicate on the subject with the Remembrancer for Legal Affairs.

I have the honour to be, &c.

(Signed) T. A. COWPER, Captain,
Inam Commissioner Northern Division.

*Minute by the Right Honorable the GOVERNOR, dated 3rd November 1855,
subscribed to by the Honorable Messrs. LUMSDEN and MALET.*

Captain Cowper in the above report has very clearly shown that in the Deccan, Khandeish, and Southern Muratha Country, there has existed ever since our acquisition of those provinces a regular system of concealment, on the part of district and village officers, of the public accounts which, under the form of revenue administration established by our predecessors, it was their special duty to record, and for the safe custody of which they were responsible.

2. He has shown, moreover, that all the attempts formerly made, soon after the succession of the British Government, by its officers, to secure the

* Campbell's "Modern India," page 372.

possession of these valuable accounts, were evaded on all sides, and unattended by any result of importance. In like manner subsequent endeavours to obtain these accounts, of the concealed existence of which the local authorities had from time to time strong reasons to be suspicious, were similarly fruitless.

3. A considerable measure of success has, however, attended the energy and tact with which Captain Cowper has recently carried out the instructions of Government to the Inam Commission to take possession of the various old accounts required for the operations of the Commission.

4. Bad as matters are in the Deccan, Southern Muratha Country, and Khandeish, there is much reason to apprehend that they are still worse in the older provinces of this Presidency; and it is certain that the serious difficulties met with in recovering Government records in the former will be found even more formidable in the latter. The enormous alienations of land, and the large amount of money stipends payable from the public treasury in Guzerat, make it the more desirable that Government should be armed with some efficient means of protecting the public interests from the frauds by which they have been so deeply injured, and His Lordship in Council is of opinion that the only means of checking such frauds for the future, and of detecting those that have been already committed, is to be found in the public accounts now alleged to be withheld and concealed by district and village officers.

5. It would appear that under this Presidency neither the revenue nor the magisterial authorities have power to cause a search to be made for concealed public records, nor is the concealment of such records punishable under any existing law. In the Madras Presidency a Collector is empowered, under Section IX. of Regulation IX. of 1822, to search for public records on information being laid on oath; and under Clause 2nd, Section XVIII. of the same Regulation, the concealment of public accounts is punishable in that Presidency by imprisonment for a period not less than one year, nor exceeding five years.

6. The Right Honorable the Governor in Council considers that under these circumstances it is not only expedient, but also absolutely necessary to apply to the Legislature for an enactment which shall provide for the following objects :—

1st.—The declaring the accounts kept by district and village officers, as well as all other accounts of the public revenues, whether under the present or former Governments, the property of Government alone; thus making the withholding of such property, or concealment of the same, punishable as a breach of trust on the part of any district or village officer, and their appropriation or concealment by others a theft, or a receiving of stolen goods.

2nd.—The empowering a Magistrate to give a search warrant on receiving credible information of any accounts of the public revenues being withheld or concealed.

3rd.—To empower Government at its discretion to confiscate the whole or any portion of a Wutun, any sharer in which shall knowingly withhold from Government on demand any records of the present or former Governments in his possession.

4th.—The exclusion from our civil courts, as evidence (except in favour of Government), of all accounts of the revenue management of former Governments after a specified date, unless such accounts are in the possession of an officer who may have been specially appointed for the custody of such accounts by Government.

7. Copy of Captain Cowper's Report and of this Resolution should be forwarded to the Honorable Company's Acting Solicitor, with instructions to prepare and transmit to Government, through the Inam Commissioner Northern Division, the draft of an Act providing for the objects above specified.

(Signed) ELPHINSTONE.
 „ J. G. LUMSDEN.
 „ A. MALET.

3rd November 1855.

Minute by the Right Honorable the GOVERNOR, without date.

There can be no doubt that an enactment of this kind is urgently required, and that Government and private individuals are defrauded by the concealment of old records and title-deeds, which is still practised in this Presidency to an extent which appears almost incredible, and with perfect impunity. The only provision in the proposed enactment which appears at all questionable is that which makes all the sharers of a Wutun answerable for the concealment by one of their number of the Government records in his possession. This provision is, however, less liable to objection than appears at first sight; for the Wutuns which may thus be attached were granted originally on account of the safe custody of the Government records, which the Deshpandays were bound to produce whenever they were called upon to do so. The Wutun may fairly be resumed when the condition upon which it was granted is eluded, and the object of the grant frustrated; and although at first it seems rather hard to punish a man who is not himself the custodian of these records, for their concealment, yet it is presumable that every sharer in a Deshpandey's Wutun has some notion of the existence of the documents, for the preservation and safe keeping of which the Wutun was originally created; and if each sharer feels that he has a personal interest in their being delivered up, it is not likely that many Dufturs will be withheld. I have thought it right to explain the grounds upon which I think that this provision, which at first sight seems rather a stringent one, may be

upheld, and which have led me to agree to Captain Cowper's proposal in its entirety.

(Signed) ELPHINSTONE.

Minute by the Honorable Mr. J. G. LUMSDEN, dated the 4th November 1855.

These observations appear to me to be founded on justice. The Wutun is held on certain conditions. To the observance of these conditions all are alike bound; and it is difficult, if not impossible, to separate the acts of one co-sharer from those of another, in respect to the fulfilment of these conditions. The failure of one, the representative of all, binds all. It might be desirable to make provision for securing the rights of any co-sharers who became instrumental in the production of State accounts which had been concealed by members of their family.

The Act, however, should be carefully worded, or it may tend, from fear of consequences, to the destruction of many old records still (fraudulently, perhaps) preserved, and which it is our object to recover.

(Signed) J. G. LUMSDEN.

4th November 1855.

Extract Paragraph 64 from a Despatch from the Honorable the Court of Directors, dated 12th December, No. 27 of 1855.

64. With reference to the belief entertained that public records are with-

3. Death of Neelkunt Rao Yeshwunt Nuggurkur. His Sufinjam (No. 26, of Class II., valued at Rs. 4,149-0-13) continued as a life-grant to his eldest son, Gunput Rao.

held by this and other families, and are even made an article of traffic for the prosecution of claims on the public revenue, we approve your having directed Captain Cowper to consider and report whether it be not possible to defeat this intention, either by legislative enactment, or by the promulgation of rules

of Government, depriving of all weight, in the prosecution of claims, records not produced or given up within a certain date, or which have remained even accidentally in concealment. As you justly remark, there can be no finality in decisions, and no protection even against perjuries, if a period be not fixed, within which proofs must be adduced and claims prosecuted.

No 811 OF 1856.

TERRITORIAL DEPARTMENT, REVENUE.

To W. HOWARD, Esq.,

Remembrancer for Legal Affairs.

SIR,—I am directed to forward to you the accompanying draft of an Act prepared by Captain Cowper, Inam Commissioner Northern Division, after consulting Mr. L. Acland, late Honorable Company's Acting Solicitor, for the purpose of providing "for the recovery of all public accounts and documents relating to the public revenue in the possession of, and improperly withheld by individuals," and to request that you will favour Government as soon as possible with such observations and suggestions thereon as may appear to you called for.

I have the honour to be, &c.

(Signed) H. YOUNG,

Officiating Chief Secretary to Government.

Bombay Castle, 12th March 1856.

No. 32 OF 1856.

To H. YOUNG, Esq.,

Officiating Chief Secretary to Government.

SIR,—I have had the honour to receive your letter dated the 12th March, No. 811 of 1856.

I have had the opportunity of going over the draft Act with Captain

Cowper, and now, with his concurrence, beg to hand up an amended draft, in the place of the former one.

I have the honour to be, &c.

(Signed) W. HOWARD,
Remembrancer for Legal Affairs.

Bombay, 8th April 1856.

••

An Act to provide for the Recovery and Protection of Public Accounts, and Documents relating to the Public Revenue, within the Bombay Presidency.

WHEREAS great numbers of the public accounts, and records kept during the time of the Native Governments, relating to the management of the public revenue, have remained up to the present time in the hands of the hereditary officers and others, and the retention thereof has occasioned great loss to the State, and to persons having just claims thereon, and has very much encouraged litigation, and the commission of forgery and perjury, and has led to great extortion being practised on private individuals; and whereas all such accounts and documents ought to be delivered up to Government, and it is expedient to make some further provision for the protection of the public records relating to the public revenue; It is hereby enacted as follows:—

I. All accounts and documents in any way relating to the management of the public revenue under the present or any former Government, now in the possession or control of any hereditary officer or other person not duly authorised by the present Government to retain possession of the same, shall be delivered up to the officers of Government as hereinafter mentioned.

II. The Governor in Council shall, by proclamation in each district, according to the form usually observed in public notifications, name the officers of Government to whom the documents mentioned in the preceding Section are to be delivered up; and all persons having any such accounts or documents in their possession or custody, and bound under this Act to deliver up the same, shall deliver up the same to some officer named in such proclamation within three calendar months from the day on which the same shall be issued.

III. Any person who, from and after the expiration of the three calendar months aforesaid, shall knowingly and wilfully retain or conceal, or assist in retaining or concealing any such account or document as aforesaid, shall be liable, on conviction before a Magistrate or other public officer authorised by the Bombay Government to investigate offences under this Act, to a fine not exceeding Rupees 500, or to imprisonment with or without hard labour not exceeding twelve calendar months, or to both those punishments.

IV. Any person not duly authorised as aforesaid, who shall be found in

the possession of any such account or document at the end of three calendar months from the day on which the proclamation shall be first issued, shall be held to have been guilty of knowingly and wilfully retaining or concealing the same, unless he can otherwise account for his possession of the said account or document to the satisfaction of the trying authority.

V. It shall be lawful for any Magistrate or other officer authorised by Government to investigate offences under this Act, on receiving credible information that any such account or document as aforesaid is in any house or other place, to issue an order for the entry and search of such house or other place, and to take possession of such account or document: provided always that dwelling-houses shall not be so entered and searched between sunset and the ensuing sunrise without urgent occasion.

VI. It shall be lawful for the Government to direct the confiscation of the whole or any portion of the Wutun or emoluments of any hereditary district or village officer, on any sharer in such Wutun or emoluments being convicted before any Magistrate or other officer duly authorised by Government to investigate offences under this Act, of having concealed or denied the existence of any such account or document as aforesaid, afterwards found in his possession, or found concealed with his knowledge, or under circumstances of which he was in his official capacity bound to have cognisance: provided always that the share of any co-sharer, on whose information, given to any officer of Government, the recovery of any such account and document may have been effected, shall not be so confiscated.

VII. From and after the issuing of the proclamation mentioned in Section II. of this Act, no account or document as aforesaid shall be received as evidence in favour, or in support of any claim upon the public revenue, in any court of law or before any tribunal or authority competent to adjudicate such claim, unless produced by, or from the custody of some officer of the existing Government duly authorised to have the custody thereof.

VIII. Government may order the payment, to any person giving information leading to the recovery of any such account or document as aforesaid, of a sum not exceeding half of the amount of the public revenue for one year recovered exclusively by means of, or on the evidence afforded by the account or document recovered as aforesaid.

IX. It shall be lawful for Government from time to time, by proclamation in the *Government Gazette*, to name the officers who are authorised to investigate offences under this Act.

X. Every person who shall destroy, or fraudulently remove from its proper place of custody, or misplace any account or document relating to the public revenue or the management thereof, with the intent that such account or document may not be produced in some judicial or other public investigation,

